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ABSTRACT

An in-depth study of telecommunications and educational technology for the State of Alaska, is presented. Part I of this report presents a summary of findings and recommendations. Part II contains supplementary data to support the study's approach and conclusions in the economic and educational technology options and telecommunications problems. The subjects covered in the chapters are: (1) Survey of Economic Conditions Affecting Educational Requirement and Financial Resources; (II) Survey of Educational Requirements; (III) Instructional Technology Options; (IV) Survey of Existing Telecommunications Facilities and Plans for Rural Communities; (V) A First Prescription of Educational Telecommunications Services; and (VI) Recommendations on Second Phase Work Program. This report may be of interest to Alaskans, Federal agencies, and commercial and industrial organizations. (Author/LS)

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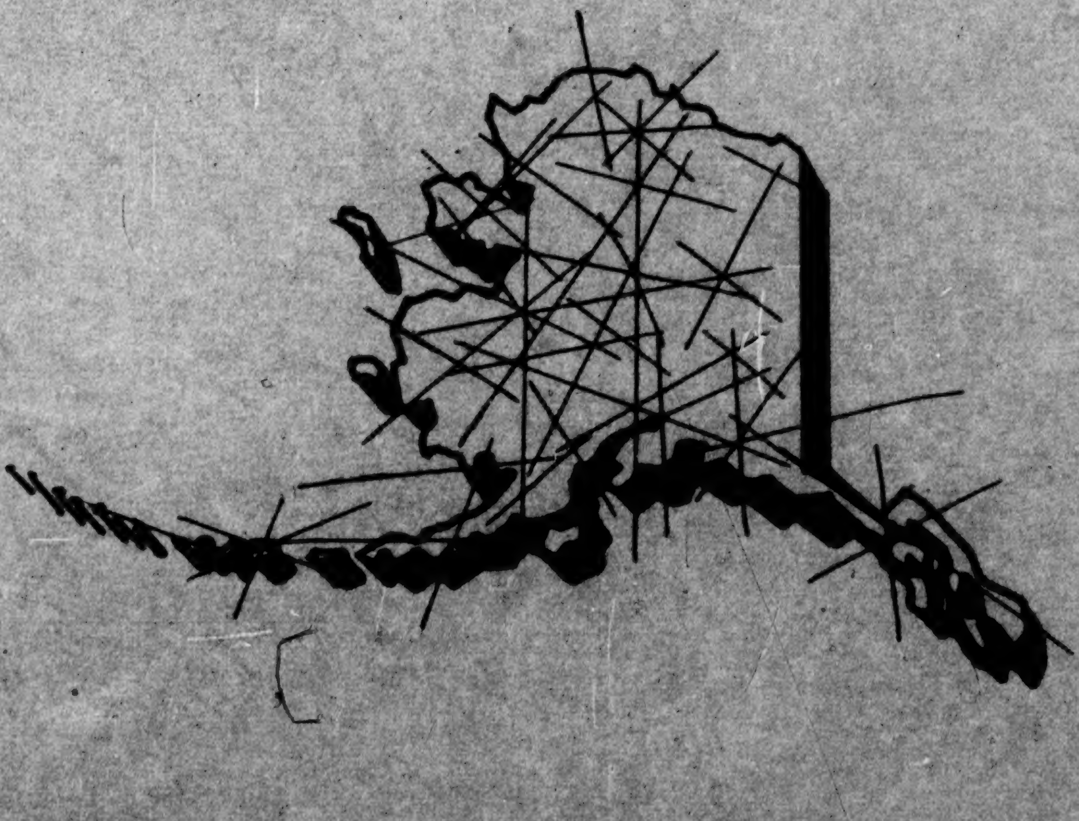
A STUDY OF THE POTENTIAL OF TELECOMMUNICATIONS AND EDUCATIONAL TECHNOLOGY TO SATISFY THE EDUCATIONAL COMMUNICATIONS NEEDS OF THE STATE OF ALASKA



Teleconsult Inc.
Washington, D.C.

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A STUDY OF THE POTENTIAL OF TELECOMMUNICATIONS AND EDUCATIONAL TECHNOLOGY TO SATISFY THE EDUCATIONAL COMMUNICATIONS NEEDS OF THE STATE OF ALASKA

Submitted to

Office of Education Department of Health, Education and Welfare	Office of Application National Aeronautics and Space Administration

via

Alaska Educational Broadcasting Commission	Alaska Educational Telecommunications Consortium

By

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Contract No. OEC-0-72-0686

LETTER OF TRANSMITTAL

Dear Mr. Arnold:

Teleconsult, Inc. has the pleasure of submitting a Final Report of the subject study to your Commission, The Alaska Educational Telecommunications Consortium, The U. S. Office of Education and the National Aeronautics and Space Administration.

Part I of this report presents a summary of our findings and recommendations. Part II contains supplementary data to support our approach and conclusions in the economic and educational technology options and telecommunications problems.

This Report also proposes certain tasks to be included in the Second Phase, and some important interim measures to pave the way towards an effective introduction of instructional technology to the rural communities. This document is also intended to be a resource work containing basic data and references to facilitate cost-effective analysis of technology options, and the evaluation of the economic feasibility of the proposed educational telecommunications network.

The study team members wish to take this opportunity to convey their appreciation for the courteous reception and friendly cooperation extended to them by various individuals and institutions in Alaska and elsewhere during this study.

Respectfully submitted,

Suilin Ling
Project Director

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SUMMARY

1. We have studied the environment and the dynamics of Alaska's demographic and economic trends with special attention given to those factors which would affect the demand for educational telecommunications services in the rural areas and the financial resources to support such a network. (Chapter I)

2. Based on our economic models, we have arrived at a projection of school-age population and school finances for the next two decades. On the whole, we expect the rural native school enrollment to be reasonably stable throughout this period. Our estimates of additional annual financial resources, out of which the proposed educational telecommunications network has to be financed, vary over a substantial range, i.e. $24-70 million at 1980, and $56-104 million at 1990. Due to the recent discovery of oil and gas reserves in the North Slope and the enactment of the Alaska Native Claims Settlement in 1971, we must entertain a certain degree of uncertainty regarding these projections. (Chapter I, Table 1-18)

3. We have identified the persistent needs of the Alaskan rural population at all levels and in all regions. They can be broadly described as follows: (Chapter II, Section 2.5)

i. Development of Self-Concept and pride in heritage
ii. Development of personal communications skills (verbal abilities and reading comprehension)
iii. Career Education — preparation for gainful employment
iv. Civic Education — knowing laws of land
v. Health Care, Mental Health and Sanitation
vi. Consumer Education and Business Methods
vii. Utilization of Leisure Time
viii The Increased Holding Power of the Schools
ix. Training of Natives as Teachers and Health Aids

x. Better Communications Between Villages — people to people, people to government

4. A sample of proposed programs to contribute to the overall solution of the above needs with the assistance of instructional and telecommunications technologies are given (Chapter II, Table 2-9). Based on our field trip and consultations with Native leaders, we further identify and recommend program series of high priorities (Chapter V, Section 5.2.2) We also proposed the creation of a Bureau of Educational Technology within the State Department of Education in Alaska to conduct overall coordinating, planning and training and other related activities (Chapter VI, Section 6.2).

5. Delivery of appropriate instructional technology via a telecommunication network to the remote rural communities is the subject of this inquiry. We have formulated a methodology in the form of a matrix (the instruction media, evaluation characteristics and learning goals) with which all of the technology-based curriculum materials in Alaska can be classified and evaluated (Chapter III, Section 3.2). It is premature at this time to present our final findings based on incomplete data. However, the bulk of our preliminary findings is included (ANNEX C).

6. Concurrent with the work to complete the above matrix and engineering system evaluation on transmission alternatives, we believe that a phased development of the proper software and management should be undertaken. In this connection and in the interest of promoting discussions, we suggest certain ideas such as (a) the formation of the regional learning resource centers, (b) the establishment of a consortium of state agencies and educational institutions to coordinate such an effort, and (c) a mobile airborne learning center before the arrival of an appropriate delivery system (Chapter III, Section 3.4 and Chapter VI, Section 6.3).

7. We have completed a survey of the existing telecommunications and electric power facilities and plans for the rural communities. Special emphasis is given to an evaluation of the relevant provisions in all domestic satellite communications proposals (Chapter IV and ANNEX D).

8. Taking into account of all our findings on requirements, and in the context of the availability of communications facilities within the next five years, we offer a first prescription of services to be provided as follows: (Chapter V)

- i. Each rural school be given a capability to receive one video channel, along with two audio channels - one for English and the other for one of the four major Alaskan native languages.
- ii. Each rural school be given one audio circuit to other schools of similar size in the same area.
- iii. Each rural school be given one audio circuit to each area headquarters.
- iv. Each area headquarters be given one audio circuit to a central headquarters (either Anchorage or Juneau).

9. In the all important area of inter-school communications amongst teachers, we propose a pilot project in the Fairbanks and Dillingham areas to obtain further data for the planning of a state-wide system in a subsequent phase (Chapter V, Section 5.3.1).

10. We propose the major tasks to be performed in the Second Phase to include the following (Chapter VI):

- i. Telecommunications system cost-effective analysis on transmission alternatives and network configuration after the completion of an integrated traffic matrix.
- ii. Cost-effective analysis of instructional media options and recommendations.
- iii. Coordination of educational technology activities at the state level and institute extensive personnel training to support the introduction of educational technology to rural areas via the proposed educational telecommunications network.
- iv. The exploration of regulatory and other institutional constraints at the state and federal levels concerning the establishment of the proposed network.
- v. Integration of the experimental results derived from ATS-F & G.

Part 1

SUMMARY OF FINDINGS AND RECOMMENDATIONS

CHAPTER I

SURVEY OF ECONOMIC CONDITIONS AFFECTING EDUCATIONAL REQUIREMENT AND FINANCIAL RESOURCES

I. 1 INTRODUCTORY OVERVIEW

Alaska is the largest state and the least populous. Its 586,412 square miles are 16 percent of the total area of the United States, but the 1970 census population of the state was only 302,173, or 0.15 percent of the national population. The average population density of less than one person per square mile is somewhat misleading, because nearly half the people lived within thirty miles of Anchorage, the state's major city. However, Anchorage is itself remote from the densely populated parts of the United States, and the remaining half of Alaska's people are indeed scattered over a vast area.

Remoteness from the temperate centers of civilization, together with a small, scattered population are the explanation of most of Alaska's peculiarities, and are the heart of many of its social and economic problems. Alaska is well known for its high costs and prices; these are probably much more the result of distance and isolation than of climate. The distance and isolation operate to increase costs through imposition of exceptional transport requirements; through inability to realize economies of scale in production, transportation and distribution; through requirements for greater inventories relative to the volume of production or consumption; through lack of competition; and through the lack of amenities that are possible only at higher population densities, requiring incentive wage differentials and resulting in high rates of labor turnover. (ANNEX A-2, source reference No. 9)

The small population is related both as cause and effect to the smallness of the economy, which rests upon only a few basic sectors, and hence unsheltered from serious fluctuations, both seasonal and cyclical, that originate in any one of these sectors. A large part of Alaska's labor force at any point in time is composed of transients and immigrants; population movements generally adjust the labor force for fluctuations in unstable industries.

A review of some of these factors in quantitative terms is warranted: in 1970, about fifty thousand people lived in census divisions in Alaska that had no year-round land transport links with each other or with the rest of North America; another fifty thousand lived on islands or mountain-ringed shorelines where they were accessible to the state's "marine highways," a system of ferries visiting each community daily to once a week. Remarkably, the state capital, Juneau, is one of the latter places.

Costs of living and of doing business are generally lower in and around Anchorage than in the rest of Alaska. Yet, U. S. Bureau of Labor Statistics surveys show Anchorage intermediate-level family budget costs in Fall 1971 at 136 percent and housing costs 158 percent of the national urban average. (ANNEX A-2 SR. No. 16) Tussing and Thomas (1971) made similar comparisons for Fairbanks and other Alaska communities based upon Bureau of Labor Statistics indexes. The Fairbanks budget cost differential in spring 1971 ranged from 137 percent of the national urban average for the higher level budget to 164 percent at the lower level; housing costs in Fairbanks were 158 to 214 percent of the national average. Indicators and analyses of construction and operating costs for residential and commercial building in urban Alaska are offered by Coxey (1968), Fischer (1969), and Massell and Massell (1972). All these studies show cost differentials of similar magnitude to those in the Bureau of Labor Statistics cost-of-living series.[1]

Federal government activities have been the biggest contributor to Alaska's economy since the beginning of World War II. Federal outlays in 1970 were still more than half of the state's economic base.[2] The growth of the oil and gas industry has had a substantial impact upon the state's economy since the mid 1960's. However, in 1970 the direct contribution to Alaska personal income from military payrolls was still more than four times that from petroleum industry wages and salaries.[3]

Nevertheless, it is upon oil and gas that the state's future economic future will chiefly depend. The largest known oil field in North America was discovered on Alaska's Arctic Coast in 1968. The next year, the state sold exploration rights in the remaining unleased land in the vicinity of Prudhoe Bay for over $900 million dollars, and the annual royalties and production taxes from that field are anticipated to amount to $300 million or more when the field reaches full production. Plans for transport facilities to carry Prudhoe Bay oil to market are now stymied by litigation over their impact upon the environment, and the timing of production is now very uncertain.

The Prudhoe Bay field and the pipeline alone were estimated in 1971 to have the potential for increasing personal income originating in the state by an amount equal to one-fourth the 1970 level; population by about one-sixth of the 1970 level; and state government revenues by almost one hundred percent.[4] Today, as a result of the 1969 lease sale, Alaska's government is the nation's wealthiest per capita, and one of only two (the other is Delaware) with a cash reserve. In the future, the state may have the largest secure flow of annual revenues per person of any state. If, however, the anticipated production of oil and gas is delayed indefinitely, the high expectations generated by the Prudhoe Bay discovery, together with the state's exceptional costs and social problems, will cause severe fiscal difficulties.

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[1] See ANNEX A-4, Table III-1.

[2] For an analysis of Alaska's economic base, see ANNEX A-1.

[3] See ANNEX A-1.

[4] See Table 1-4.

In some indicators of personal welfare, Alaska rates high. For example, Alaskans on the average have a higher level of school achievement, and have higher incomes, at least in money terms, than other Americans. Yet there are a number of other indicators of deep problems: the state has the highest rate of death by accidents, the highest suicide rate, and the highest alcohol consumption per capita. It also has the sixth highest homicide rate, 54 percent higher than the national average, and the sixth highest rate of forcible rape. (ANNEX A-2, SR. No. 9)

Among the state's serious problems are also the circumstances of a majority of its Native (Eskimo, Indian and Aleut) people, who comprised 17 percent of the state's 1970 census population. Most Natives (66 percent of them) lived in the remote areas, away from the continental transport network, and they comprised two-thirds of the population in those areas. Native levels of employment and income, of school achievement, physical and mental health, longevity, and almost every other conventional measure of personal or social welfare, were substantially lower than those for non-Native Alaskans or for the United States population as a whole. The circumstances, particularly the cultural and physical isolation, of the rural Native population, are of course the principal challenge to educational telecommunications in Alaska.

The sections that follow project the likely population of Alaska by region (measured by degree of isolation), and the funds prospectively available for educational purposes, upon a series of assumptions about economic and demographic developments. A caveat should be kept in mind in interpreting any of these projections: Alaska's economy and population trends have changed drastically a number of times in the past in response to developments that were practically unforseeable. There is little reason to expect this pattern to end, nor to grant much confidence to projections that extend more than a very few years into the future.

1. 2 DEMOGRAPHIC HISTORY AND PROJECTION

1. 2. 1 Demographic History

Alaska's 1970 census population was 302,173, or .15 percent of the national population. Table 1-1 shows the geographic distribution of this factor by degrees of remoteness. The regions are the Anchorage census division; the two divisions directly adjacent to Anchorage; Fairbanks; those other divisions with year-round land transport connections; those divisions accessible (in the populated areas) by state ferries; and the Bush (the remainder of the state). These divisions are indicated in Figure 1-1. Almost half of the state's population was located in Anchorage and the immediately surrounding areas; almost two thirds in that area plus Fairbanks. And Anchorage and its environs alone contributed 71 percent of the state's total population growth between 1960 and 1970.[5]

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[5] See ANNEX A-2, Table I-1.

TABLE 1-1

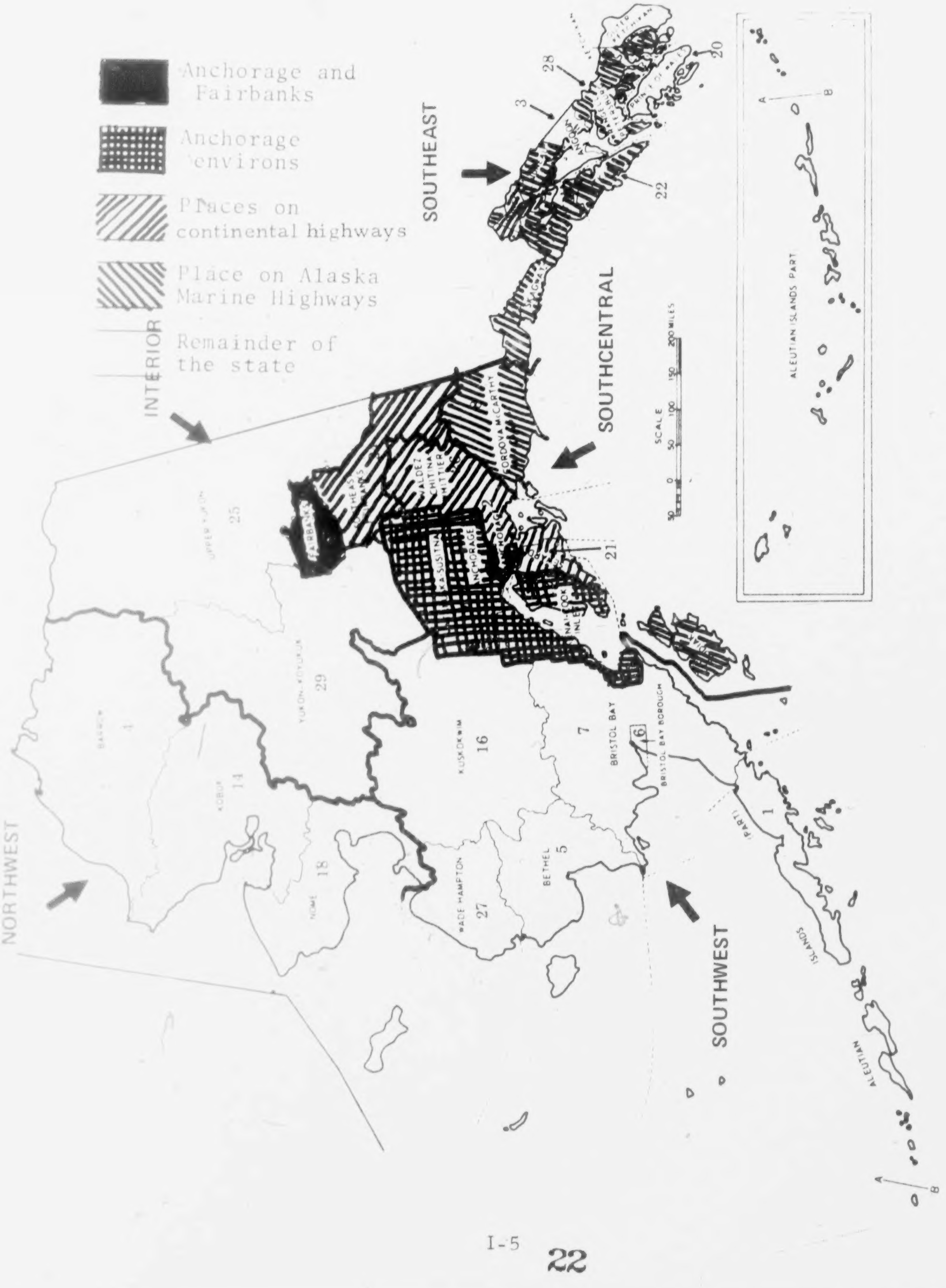
DISTRIBUTION OF ALASKA POPULATION BY LOCATION, 1970[a]

REGIONS	Total Persons	Percentage of State Total	Cumulative Percentage	Increase Since 1960 (percent)
ANCHORAGE	124,542	41	41	53
ANCHORAGE ENVIRONS[c]	20,759	7	48	77
FAIRBANKS[b]	45,864	15	63	11[e]
PLACES ON CONTINENTAL HIGHWAY SYSTEM OTHER THAN ABOVE[i]	11,117	4	67	13[f]
PLACES ON ALASKA MARINE HIGHWAY SYSTEM ONLY[d]	48,042	16	83	22[g]
REMAINDER OF THE STATE	50,058	17	100	20
STATE TOTAL	300,382	100	100	34[h]

a) Preliminary population count. Details are not available for corrected population.
b) Fairbanks census division.
c) Matanuska-Susitna and Kenai-Cook Inlet Census divisions.
d) Cordova-McCarthy, Juneau, Ketchikan, Kodiak, Sitka, Skagway-Yakutat, and Wrangell-Petersburg census divisions.
e) Fairbanks city.
f) 1969 Fairbanks census district less Fairbanks City, plus Seward and Valdez-Chitina-Whittier census districts.
g) 1960 census districts same as 1970 census divisions, except Lynn Canal-Icy Straits for Skagway-Yakutat.
h) Corrected population.
i) Southeast Fairbanks, Valdez-Chitina-Whittier, and Seward census divisions.

FIGURE I-1

REGIONS USED IN THIS STUDY AND 1970 CENSUS DIVISIONS, ALASKA


Anchorage and Fairbanks
Anchorage environs
Places on continental highways
Place on Alaska Marine Highways
Remainder of the state
SOUTHEAST
SOUTHCENTRAL
INTERIOR
NORTHWEST
SOUTHWEST
28
3
20
22
21
FAIRBANKS
ANCHORAGE
VALDEZ
CHITINA
WHITTIER
CORDOVA-McCARTHY
KENAI-COOK INLET
UPPER YUKON
25
YUKON-KOYUKUK
29
BARROW
4
KOBUK
14
NOME
18
KUSKOKWIM
16
BRISTOL BAY
7
6
BRISTOL BAY BOROUGH
BETHEL
5
WADE HAMPTON
27
(PART)
1
ALEUTIAN
ISLANDS
ALEUTIAN ISLANDS PART
SCALE
0
50
100
150
200 MILES
A
B

About two thirds of the population of Alaska Natives lived in the Bush (the areas without year-round land transport) in 1970. This distribution existed despite substantial Native migration to the cities, which since 1960 had almost tripled Anchorage's Native population, and more than doubled that of Fairbanks! This distribution of Native population, by location, is set out in Table 1-2. Table 1-3 shows the distribution of school age (6 to 16 years) population.[6]

1. 2. 2 Regional School Age Population Forecast

1. 2. 2. 1 Employment and Migration Considerations

Any forecast of Alaska's future population, its age and sex distribution, or its location, is subject to some severe qualifications. The population of non-Natives in Alaska is powerfully and directly determined by economic conditions, and particularly by the level of employment in a handful of basic industries, most of which are exceptionally unstable, and whose futures are surrounded with great uncertainty. Alaska's modern history is one of booms and recessions which attracted or drove out large portions of the total population: the average population change between decennial censuses in the period 1880 to 1970 was 37 percent, plus or minus![7] In 1952, for example, net in-migration equalled 16 percent of the state's total population, and in 1958, net out-migration was ten percent of the total. Of the state's 1960 census population, 46. 6 percent had lived somewhere else in 1955, and 31. 4 percent of those who lived in Alaska in 1955 had moved away by the time of the 1960 census.[8]

At the time this report was written, the state-of-origin data from the 1970 census were not yet available, but there are indications that recent population movements have not been as drastic as those of the 1950's. Nevertheless, the state's economic activity, employment level, and thereby its population still rest very heavily upon the federal government, particularly upon military operations, and upon the oil and gas industry. Forecasts of the future in either of these sectors must be highly speculative, and 1980 populations as much as 30 percent lower than that of 1970, or as much as 60 percent greater, are not implausible.

Military payrolls alone amounted to 17 percent of 1970 personal income in Alaska, and total government activities to 46 percent, compared to 2 and 18 percent respectively for the United States as a whole.[9] It is probable that defense

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[6] ANNEX A-2, Table I-2 shows the actual enrollment in the three major school systems of Alaska and in independent schools.

[7] See ANNEX A-2, Table I-3.

[8] George W. Rogers has pointed out the direct relationship between Department of Defense and construction employment, and Alaska's net population movements. See ANNEX A-1, Figure II-2.

[9] See ANNEX A-1, Figure II-2.

TABLE I-2

DISTRIBUTION OF ALASKA NATIVE POPULATION BY LOCATION, 1970[a]

REGIONS	Total Persons	Percentage of State Total	Cumulative percentage	Increase Since 1960 (percent)	Percentage of Total Population
ANCHORAGE	5,032	10	10	197	4
ANCHORAGE ENVIRONS[c]	1,211	2	12	22	6
FAIRBANKS[b]	1,785	4	16	134	4[e]
PLACES ON CONTINENTAL HIGHWAY SYSTEM OTHER THAN ABOVE[h]	1,777	3	19	4	16[f]
PLACES ON ALASKA MARINE HIGHWAY SYSTEM ONLY[d]	8,212	16	35	0	17[g]
REMAINDER OF THE STATE	32,868	65	100	14	66
STATE TOTAL	50,885	100	100	21	17

a) Preliminary population count. Details are not available for corrected population.

b) Fairbanks census division.

c) Matanuska-Susitna and Kenai-Cook Inlet census divisions.

d) Cordova-McCarthy, Juneau, Ketchikan, Kodiak, Sitka, Skagway-Yakutat, and Wrangell-Petersburg census divisions.

e) Fairbanks city

f) 1960 Fairbanks census district less Fairbanks city, plus Seward and Valdez-Chitina-Whittier census districts.

g) 1960 census districts same as 1970 census divisions, except Lynn Canal-Icy Straits for Skagway-Yakutat.

h) Southeast Fairbanks, Valdez-Chitina-Whittier, and Seward census divisions.

TABLE 1-3

DISTRIBUTION OF ALASKA SCHOOL AGE POPULATION (6 to 16 years) BY LOCATION, 1970[a]

REGIONS	Total Persons	Percentage of State Total	Cumulative Percentage	Increase Since 1960 (percent)	Percentage of Total Population
ANCHORAGE	31,071	41	41	100	25
ANCHORAGE ENVIRONS[c]	5,933	8	49	109	29
FAIRBANKS[b]	9,764	13	62	4	21[e]
PLACES ON CONTINENTAL HIGHWAY SYSTEM OTHER THAN ABOVE[h]	2,584	3	65	3	23[f]
PLACES ON ALASKA MARINE HIGHWAY SYSTEM ONLY[d]	12,094	16	81	38	25[g]
REMAINDER OF THE STATE	13,912	18	100	102	29
STATE TOTAL	75,358	100	100	64	25

a) Preliminary population count. Details are not available for corrected population.

b) Fairbanks census division.

c) Matanuska-Susitna and Kenai-Cook Inlet census divisions.

d) Cordova-McCarthy, Juneau, Ketchikan, Kodiak, Sitka, Skagway-Yakutat, and Wrangell-Petersburg census divisions.

e) Fairbanks 1960 census district.

f) Seward and Valdez-Chitina-Whittier census districts.

g) 1960 census districts same as 1970 census divisions, except Lynn Canal-Icy Straits for Skagway-Yakutat.

h) Southeast Fairbanks, Valdez-Chitina-Whittier, and Seward census divisions.

related activities still amount to about 30 percent of the state's economic base, so that a reduction of military outlays could cause a serious contraction of employment, leading to substantial out-migration. On the other hand, construction of the proposed Trans-Alaska pipeline is expected to increase total employment in the state by about one fifth and population by about one-sixth of the 1970 level. The expected impact of this project is shown in Table 1-4.

Although there has been some out-migration of Alaska Natives from the state, their future numbers are far more susceptible to projection by demographic models than are those of non-Natives, for whom the influence of natural increase is wholly swamped by fluctuating movements in and out of the state. Demographic projections of Native population, however, suffer from a major uncertainty in the fact that vital rates have been extremely changeable. The crude birth rate increased from 40. 5 per thousand in 1950 to 48. 9 in 1956, and then fell as low as 29. 7 in 1969. Crude death rates fell steadily from 16. 8 in 1950 to 7. 3 in 1970. Infant death rates for Alaska Natives fell even more sharply, from 100. 4 in 1951 to 28. 5 in 1970. Superficially these rates would seem to imply a reduced but still high rate of population growth. However, because of much higher birth rates in the recent past, these trends mean that the number of school-age children will actually decline over the next ten to fifteen years. (Part of this tendency can be grasped in the fact that the number of Native children born in 1969 was 30 percent less than the figure for 1962, and was lower than for any year after 1950.) Later, unless birth rates continue to decline drastically, the school-age population will increase again, as reproduction rates are not yet down to the long-term zero growth rate. It is not clear whether the downward trend in birth rates is permanent, or where it will stop; the crude birth rate did show a slight upward movement between 1969 and 1970, from 29. 7 to 33. 0 per thousand. (ANNEX A-2, SR. No. 7)

Although Native migration out of Alaska has not apparently been a major determinant of Native population trends, movement of Natives within Alaska is significant, but is almost impossible to project with confidence. There have been no comprehensive quantitative studies of past Native migration; moreover, the circumstances of Alaska Natives are changing so rapidly that it would be hazardous to project past behavior into the future. It would be a reasonably accurate generalization to say, on the basis of the 1950, 1960 and 1970 censuses, that Native villages as a whole are not disappearing or being depopulated; that migration out of the "bush" has been considerably less than the natural increase in Native population, except in Southeastern Alaska and along the highway system. However, the smallest villages (those of less than 200 population) have indeed tended to decline.[10] Whether this pattern will continue in the fact of rapid economic and cultural change is difficult to forecast.

The greatest potential influences on Native migration in the near future are increased cultural contact with modern urban life through the schools, television,

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[10] See ANNEX A-2, Table I-5.

TABLE 1-4

INCREMENTAL ECONOMIC IMPACT OF NORTH SLOPE PETROLEUM DEVELOPMENT PRODUCTION AND TRANSPORTATION

	Peak Year	Peak Values	1975	1980	1990	2000
		(annual average - thousands)				
Employment						
Petroleum-Related	1972-73	20.9	8.1	2.9	2.1	1.6
Secondary Effects	1982	22.8	13.0	22.2	18.7	14.3
Total	1972-73	27.7	21.1	25.1	20.8	15.9
		(thousands)				
Population						
Petroleum-Related	1972-73	37.7	19.6	8.9	6.6	4.9
Secondary Effects	1982	43.3	24.7	42.1	35.5	27.2
Total	1981-82	51.7	44.3	51.0	42.0	32.1
		(million dollars)				
State Finances						
Revenues	2000	397.9	121.0	302.5	383.9	397.9
Petroleum-Related Outlays	1974	11.9	7.5	4.0	3.9	3.9
Petroleum-Related Payrolls	1973	341.3	125.0	53.2	53.2	53.2
Alaska Personal Income	2000	499.9	318.1	434.3	485.1	499.9

Souce: Tussing, Rogers and Fischer, Alaska Pipeline Report. University of Alaska, 1971.

and travel, and the Native claims settlement Act.[11] The influence of the first factor is predominantly to increase the outflow from the villages, but the impact of the claims settlement is not at all clear. There is apparently an historical tendency for Natives with relatively higher incomes to move to the cities (or even outside Alaska). However, most of the benefits from the settlement Act are to be channeled through village organizations, and the net impact of this provision will be a deterrent to out-migration, and in some cases at least, an incentive for former villagers to return. What the net effect of the two influences will be can only be guessed.

1. 2. 2. 2 High, Low and Intermediate Range Forecasting Models

The following projections should be considered only with the previous cautions in mind. Four different sets of projections have been provided for the school age (6 to 16) population of Alaska, corresponding to different assumptions about economic conditions and migration behavior. None of the sets of assumptions is wholly realistic, and the group of them does not necessarily bracket the range of plausible extremes. Nevertheless, these projections do give a set of bases from which variations can be considered.

Each of the projections starts from the 1970 age-race-sex distribution of population in Alaska census divisions. In each case natural increase is calculated using the ratios of 1970 Alaska Native and non-Native births to the numbers of females 15 to 44, and the 1967 white and non-white mortality tables for the United States.

The Low Case (Table 1-5) assumes that there is no increase in employment in Alaska after 1970, and that new entrants to the labor force from natural increase have to be offset by migration (of non-Natives only) from the state. The 1970 labor force participation rate for persons 15-64, and the 1970 annual average unemployment rates (by labor market area) are assumed to continue, as is the 1970 dependency rate (population/labor force). Out-migrants are assumed to have the same age-sex profile as non-Natives generally, and the same dependency ratio as the statewide labor force.

The Intermediate Case (Table 1-6) is the result of natural increase alone, without any migration in or out of, or within the state. This variant assumes either a growth of employment, or changes in participation and unemployment rates just sufficient to accommodate natural increase in each region.

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[11] The Alaska Native Claims Settlement Act of 1971 granted Alaska Natives, through a structure of village and regional corporations, $462. 5 million dollars from the federal treasury over eleven years, and up to $500 million dollars from mineral leasing revenues; also the right to select 40 million acres of public lands to be held in fee. See also ANNEX A-3.

TABLE 1-5

ALASKA SCHOOL AGE POPULATION (6 to 16 years)
BY LOCATION, 1970-1990
Low Case: No Employment Growth, No Intrastate Migration

REGIONS	1970		1975		1980		1985		1990	
	Total	Native	Total	Native	Total	Native	Total	Native	Total	Native
ANCHORAGE	31.1	1.9	31.1	1.5	30.1	1.8	30.6	1.9	32.7	2.5
ANCHORAGE ENVIRONS[a]	5.9	.4	5.7	.4	5.7	.3	5.8	.4	6.2	.5
FAIRBANKS	9.8	.6	9.6	.6	9.4	.5	9.5	.5	10.1	.6
PLACES ON CONTINENTAL HIGHWAY SYSTEM OTHER THAN ABOVE[b]	2.6	.5	2.4	.5	2.2	.5	2.2	.5	2.4	.6
PLACES ON ALASKA MARINE HIGHWAY SYSTEM ONLY[c]	12.0	3.1	11.3	3.1	10.8	2.8	10.9	3.1	11.5	3.7
REMAINDER OF THE STATE	13.9	11.2	13.6	10.9	13.7	10.1	13.9	10.8	15.4	13.0
STATE TOTAL	75.3	17.7	73.7	17.4	72.0	16.0	72.9	17.3	78.4	21.0

Notes:

a) Matanuska-Susitna and Kenai-Cook Inlet census divisions.

b) Haines, Seward, Southeast Fairbanks, and Valdez-Chitina-Whittier census divisions.

c) Cordova-McCarthy, Juneau, Ketchikan, Kodiak, Sitka, Skagway-Yakutat, and Wrangell-Petersburg census divisions.

TABLE 1-6

ALASKA SCHOOL AGE POPULATION (6 to 16 years) BY LOCATION, 1970-1990

Intermediate Case: No Migration

REGIONS	1970		1975		1980		1985		1990	
	Total	Native	Total	Native	Total	Native	Total	Native	Total	Native
ANCHORAGE	31.1	1.9	32.2	1.9	33.6	1.8	33.9	1.9	36.3	2.5
ANCHORAGE ENVIRONS[a]	5.9	.4	6.0	.4	6.4	.3	6.6	.4	7.0	.5
FAIRBANKS	9.8	.6	10.4	.6	10.6	.5	10.4	.5	10.8	.6
PLACES ON CONTINENTAL HIGHWAY SYSTEM OTHER THAN ABOVE[b]	2.6	.5	2.7	.5	2.8	.5	2.7	.5	2.9	.6
PLACES ON ALASKA MARINE HIGHWAY SYSTEM ONLY[c]	12.0	3.1	12.4	3.1	12.4	2.8	12.6	3.1	13.7	3.7
REMAINDER OF THE STATE	13.9	11.2	14.1	10.9	13.3	10.1	14.1	10.8	16.8	13.0
STATE TOTAL	75.3	17.7	77.8	17.4	79.9	16.0	80.5	17.3	87.0	21.0

Notes:

a) Matanuska-Susitna and Kenai-Cook Inlet census divisions.

b) Haines, Seward, Southeast Fairbanks, and Valdez-Chitina-Whittier census divisions.

c) Cordova-McCarthy, Juneau, Ketchikan, Kodiak, Sitka, Skagway-Yakutat, and Wrangell-Petersburg census divisions.

The High Case I (Table 1-7) assumes a labor and population influx as forecast in the Alaska Pipeline Report, (ANNEX A-2, SR. No. 10) except that pipeline construction and its sequelae are delayed one year behind the original pipeline schedule. All in-migrants are assumed to be non-Native, and the age-sex, labor force participation, employment-unemployment characteristics of in-migrating (non-transient) workers are assumed to be the same as for the 1970 statewide Alaska white and negro population. Using the regional division provided in the Alaska Pipeline Report, "Southern Region" in-migrants are distributed 70 percent to Anchorage, 10 percent to Anchorage environs, 10 percent to points on the continental highway system (principally Valdez), and 10 percent to places on the Alaska Marine Highway system (principally Juneau) "Northern Region" in-migrants are distributed 70 percent to Fairbanks, 15 percent to places on the continental highway system (Southeast Fairbanks), and 15 percent to the remainder of the state (Upper Yukon and Barrow).

The High Case II (Table 1-8) assumes a labor and population influx as in High Case I, but assumes that three percent of its remaining Natives in regions other than Fairbanks and Anchorage migrate to those divisions each year in proportion to their 1970 Native populations. The age-sex profile of migrants is assumed to be the same as that of the divisions they left.

The projection which is of particular interest for this study is the school-age population in the bush areas, classified as "remainder of the state." A tabulation of this projection for 1980 and 1990 is shown in Table 1-9 for all cases.

1. 2. 2. 3 Caveats

It was noted before that it is conceivable that total employment and population in Alaska might actually decline; if it did so, it would probably be a result of major defense cutbacks. This development would lead to school-age population figures for future years even lower than those in the Low Case (72. 0 thousand in 1980). Or, if there are no major defense cutbacks, and if the TransAlaska pipeline is indeed constructed, and at the same time, substantial new oil discoveries or resource developments occur, populations might be even higher than those forecast in the two higher cases (97. 5 thousand in 1980).

Intrastate migration too may plausibly exceed the limits of the projections presented herein, particularly with respect to the Bush ("remainder of the State"). A substantial upswing in vollage economies resulting from the Native claims settlement provisions might cause the return of some Natives to the Bush from the cities or even from outside of Alaska, so that our high estimates of total school-age population in these areas (16. 5 thousand in 1980) might be exceeded. On the other hand it is not inconceivable that higher educational attainments and new job opportunities, together with effects of the claims settlement, would indeed depopulate the villages and lead to school-age populations substantially less than those indicated in the lowest instance (13. 3 thousand in 1980).

Finally, it should be noted that all the projections are based upon 1970

TABLE 1-7

ALASKA SCHOOL AGE POPULATION (6 to 16 years)
BY LOCATION, 1970-1990
High Case I: Net In-Migration, No Intrastate Migration

REGIONS	1970		1975		1980		1985		1990	
	Total	Native	Total	Native	Total	Native	Total	Native	Total	Native
ANCHORAGE	31.1	1.9	39.6	1.9	41.3	1.8	41.2	1.9	43.6	2.5
ANCHORAGE ENVIRONS[a]	5.9	.4	7.1	.4	7.4	.3	7.6	.4	8.2	.5
FAIRBANKS	9.8	.6	12.8	.6	13.6	.5	12.9	.5	13.3	.6
PLACES ON CONTINENTAL HIGHWAY SYSTEM OTHER THAN ABOVE[b]	2.6	.5	4.5	.5	4.5	.5	4.6	.5	4.4	.6
PLACES ON ALASKA MARINE HIGHWAY SYSTEM ONLY[c]	12.0	3.1	13.8	3.1	14.2	2.8	14.2	3.1	14.5	3.7
REMAINDER OF THE STATE	13.9	11.2	16.8	10.8	16.5	10.1	16.5	10.8	17.1	13.0
STATE TOTAL	75.3	17.7	04.6	17.4	97.3	16.0	97.1	17.3	101.7	21.0

Notes:

a) Matanuska-Susitna and Kenai-Cook Inlet census divisions.

b) Haines, Seward, Southeast Fairbanks, and Valdez-Chitina-Whittier census divisions.

c) Cordova-McCarthy, Juneau, Ketchikan, Kodiak, Sitka, Skagway-Yakutat, and Wrangell-Petersburgh census divisions.

TABLE 1-8

ALASKA SCHOOL AGE POPULATION (6 to 16 years) BY LOCATION, 1970-1990

High Case II: Net In-Migration of non-Natives;
Native Migration to Alaska Cities

REGIONS	1970		1975		1980		1985		1990	
	Total	Native	Total	Native	Total	Native	Total	Native	Total	Native
ANCHORAGE	31.1	1.9	40.5	3.6	42.6	4.4	43.2	5.9	46.7	8.6
ANCHORAGE ENVIRONS[a]	5.9	.4	7.0	.3	7.3	.2	7.5	.3	8.1	.3
FAIRBANKS	9.8	.6	13.1	1.1	14.1	1.4	13.6	1.9	14.4	2.7
PLACES ON CONTINENTAL HIGHWAY SYSTEM OTHER THAN ABOVE[b]	2.6	.5	4.4	.4	4.4	.4	4.5	.4	4.3	.3
PLACES ON ALASKA MARINE HIGHWAY SYSTEM ONLY[c]	12.0	3.1	14.6	2.7	13.9	2.1	13.8	2.0	14.0	2.0
REMAINDER OF THE STATE	13.9	11.2	17.0	9.3	15.2	7.5	14.5	6.8	12.1	7.1
STATE TOTAL	75.3	17.7	96.6	17.4	97.5	16.0	97.1	17.3	99.6	21.0

Notes:

a) Matanuska-Susitna and Kenai-Cook Inlet census divisions.

b) Haines, Seward, Southeast Fairbanks, and Valdez-Chitina-Whittier census divisions.

c) Cordova-McCarthy, Juneau, Ketchikan, Kodiak, Sitka, Skagway-Yakutat, and Wrangell-Petersburg census divisions.

TABLE 1-9

ALASKA BUSH AREA SCHOOL AGE POPULATION

(6 to 16 years) Projection, 1970-1990

(in thousands)

	1970		1980		1990	
	Total	Native	Total	Native	Total	Native
1. Low Case						
No employment growth No Intrastate migration	13.9	11.2	13.7	10.1	15.4	13.0
2. Intermediate Case						
No migration	13.9	11.2	13.3	10.1	16.8	13.0
3. High Case I						
Net In-migration No Intrastate migration	13.9	11.2	16.5	10.1	17.1	13.0
4. High Case II						
Net In-migration of non-natives Native migration to cities	13.9	11.2	15.2	7.5	12.1	7.1

birth rates, and any departure from them would have a substantial effect on figures for the later years (but not for 1975, as all persons in that age group had already been born in 1970). The projections are not, on the other hand, very sensitive to possible death rate changes. There are, of course, a host of other assumptions upon which the projections depend: for example, the long-term behavior of population as a function of employment, and the constancy of labor force participation and unemployment rates. Large departures in any of these cases could affect actual populations substantially.

I. 3 EDUCATIONAL FINANCIAL RESOURCES

I. 3. 1 Background

There are three principal systems of public elementary and secondary schools in Alaska: rural schools operated by the federal Bureau of Indian Affairs; rural, regional and military base schools operated by the state Department of Education; and local schools operated by borough governments (similar to counties in other states) and independent school districts. In the 1969-70 school year, 8 percent of the state's primary and secondary school enrollment was in BIA schools, 18 percent in state operated schools, and 71 percent in borough and district schools. (An additional 2 percent of the school population were in private and denominational schools.)[12]

Most (88 percent) of the increase in total enrollment between 1960 and 1970 occurred in the borough and district schools, reflecting in part the formation of new school districts and the boarding of rural children in regional centers, but it was mostly the result of the more rapid population increase in the urban areas, and particularly in Anchorage.

There is no source of consolidated or normalized school financial information for Alaska. Sources of data include individual school districts, the state Department of Education, the Bureau of Indian Affairs, the U. S. Office of Education, and the National Education Association, but each uses a different accounting scheme and in particular treats capital outlays and inter-governmental transfers differently. Totals seldom agree, and the annotation is never sufficient to indicate clearly what is included in each total. We have not been able, within the scope of this study, to assemble correct totals for either revenues or expenditures, or to reconcile the two. Nevertheless, a qualitative and approximate picture of Alaska school finances can be assembled by comparing various components of revenues and expenditures, either with those of other states, as they change over time, or with other measures of economic or educational activity.

I. 3. 2 Fiscal Performance by National Standards

The state's fiscal performance in public education (i. e., that of state, borough and district schools), ranks relatively high by national standards. The fall 1970 pupil-teacher ratio (20.9; the national average was 22.3) was the lowest in the West, and tied for tenth among the states and the District of Columbia. In 1970-71, Alaska was first in per-pupil operating expenditures ($1,429; the national average was $858); the margin of two-thirds above the national average surely offsets even the exceptionally high costs of operating in the state, compared with other parts of the country. The average 1971 teacher salary in Alaska was $13,570, highest of all states; the differential of 46 percent above the national average probably was very close to the average cost of living handicap for the state's teachers.[13] Total outlays (including capital outlays) for state and local schools in 1970-71 were estimated at $142 million, 10.1 percent of 1970 Alaska personal income[14], nationally only 5.7 percent of personal income was spent on public education.[15] Moreover, the trend in educational expenditure has been distinctly upward by almost any measure. Table 1-10 shows an increase in expenditures on state operated schools of 179 percent between 1966 and 1971, a growth from 1.1 to 1.9 percent of state personal income. Between 1966 and 1970, the total revenues of borough and district schools[16] for current expenditures increased 63 percent, and grow relatively from 4.4 to 4.8 percent of state personal income. Simultaneously, between 1966 and 1972, BIA operating expenditures on Alaska Native schools grew 128 percent, and also increased as a ratio to personal income.

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[12] See ANNEX A-2, Table I-2.

An assessment of the state and local fiscal "effort" in Alaska is more ambiguous. The state's 1968-69 total state and local revenues (including federal grants) were the highest in the United States on a per capita basis ($1,041; the national average was $567); they were also first as a proportion of (calendar 1968) personal income (30.2 percent; the national average was 17.1 percent). However the state's own 1969 per capita state and local tax revenues were only 14th nationally ($390), barely higher than the national average ($380); as a proportion of personal income, Alaska's tax revenues were 40th amongst the states, with 9.7 percent, compared to a national average of 11.2 percent.

1.3.3 Federal Assistance 1966-1971

The difference between Alaska's performance in spending and in state tax effort is explained by the exceptional role of federal assistance in school financing.

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[13] National Education Association, Estimates of School Statistics, 1970-71. For cost of living figures, see ANNEX A-1 section on prices and costs; Tables II-3 and III-1 in ANNEX A-4.

[14] Addition of the BIA's $17 million for current expenditures and $5 million for buildings and utilities brings the percentage to 11.5. BIA figures are from Table 1-10 and ANNEX A-4, Table III-2.

[15] All educational statistics in this paragraph, not otherwise referenced, are from U.S. Department of Health, Education and Welfare, Office of Education, Fall 1970 Statistics of Public Education and Digest of Educational Statistics, 1970.

[16] Capital outlays for district schools are often combined with general government figures.

TABLE 1-10

ALASKA SCHOOL OPERATING EXPENDITURES and/or REVENUES, FISCAL 1966-72

Fiscal Year	Expenditures				Revenue	Total
	Bureau of Indian Affairs	State Operated Schools			Borough and District Schools	
		Rural Schools[b]	On-Base Schools	Total		
		(thousands of dollars)				
1966	8,163	3,340	5,555	9,507	37,556	55,226
1967	9,234	4,042	5,671	10,732	41,940	61,906
1968	9,231	7,114	7,852	14,050	46,912	70,196
1969	10,847	6,119	6,677	14,388	54,443	79,678
1970	12,878			16,412	60,704	89,994
1971	17,066			26,508		
1972	18,652[a]					
	(percentage of state personal income, preceding calendar year)					
1966	1.0			1.1	4.4	6.5
1967	1.0			1.2	4.6	6.7
1968	0.9			1.5	4.6	6.8
1969	1.0			1.3	4.8	7.0
1970	1.0			1.3	4.8	7.2
1971	1.2			1.9		
1972						

Sources: Bureau of Indian Affairs - Edward G. Marich, Budget Officer, Office of Education Programs, U. S. Department of the Interior, Bureau of Indian Affairs; State Operated Schools, State of Alaska, Department of Administration, Annual Financial Report; District Schools - State of Alaska, Department of Education, Annual Report; Personal Income - Survey of Current Business, August of each year.

Notes:
- a) estimate
- b) rural and regional schools
- c) includes general administration and other items not in subcategories.

In addition to the wholly federally supported BIA school system, more than a quarter of the support for state and local schools comes from federal sources; see Tables 1-11 and 1-12. The largest single source of federal funds are received under P. L. 874 and 815, which provide relief for school districts impacted by the federal government (by military establishments or by large proportions of federal property in the taxing jurisdiction, reducing the area's tax base). These sources provide most of the support for the state operated on-base schools and a substantial part of that for both the state rural and regional schools and for district schools surrounded by federal lands or near major military installations. The other major source of federal funds has been the Johnson-O'Malley Act, which provides assistance for Indian (also Eskimo and Aleut) children in non-federal schools. It has become increasingly important as the state has taken over former BIA schools.

The fiscal base for support of public schools in Alaska has grown rapidly. Despite the continuing transfer of rural schools to the state, and a consequent decline in the number of pupils, BIA outlays for education have shown a steady increase. (See Table 1-10 and ANNEX A-2, Table I-2). Alaska's eligibility for federal assistance to state and local schools grew by almost one and one-half times between 1966 and 1971. Most significantly, the state's fiscal situation changed dramatically in 1968 with the discovery of North America's largest known oil field. A sale of exploration rights in the vicinity of the Prudhoe Bay field brought the state a $900 million windfall of bonus revenues in 1969; production plans generated expectations of $300 million or more in annual royalties and taxes (See Table 1-4 and ANNEX A-1). One major impact of these developments was a sharply increased appropriations for school support; fiscal 1970 outlays for state operated schools were 14 percent above those for the previous year, and 1971 expenditures were a whopping 62 percent above 1972. Revenue sharing with the boroughs and school districts was also expanded: the increase in state support of local schools increased 41 percent between fiscal 1969 and 1970, and another 74 percent between 1970 and 1971!

These increases in state funding did not, however, lead to a comparable growth in local school spending. In a large degree they have been offset by reductions in local fiscal effort, despite substantial increases in assessed valuations. (Table 1-14) The typical response of school boards, borough assemblies, and local voters to the increase in outside funds has been to cut local tax rates drastically. By national standards, Alaska's real property taxes have not been onerous[17], but of the nine jurisdictions that had property taxes

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[17] In 1969 Alaska was 36th in per capita state and local property taxes ($104; the national average was $152). The state was tied for 46th in property tax collections as a proportion of personal income (2. 3 percent; the national average was 4. percent). U. S. Department of Commerce, Bureau of the Census, Governmental Finances in 1968-69.

TABLE 1-11

ESTIMATED REVENUE AND NON-REVENUE RECEIPTS OF PUBLIC ELEMENTARY AND SECONDARY SCHOOLS, BY SOURCE AND SELECTED STATE: 1968-69

(Amounts in Thousands)

State	Total Revenue and Non-Revenue Receipts	Revenue Receipts							Non-Revenue Receipts
			Federal(1)		State		Local and Other(2)		
		Total	Amount	per-cent	Amount	per-cent	Amount	per-cent	
Alaska	98,733	73,310	18,830	25.7	32,780	44.7	21,700	29.6	25,423
California	1,055,000	3,675,000	215,000	5.9	1,260,000	34.3	2,200,000	59.9	380,000
Montana (3)	139,000	127,000	9,000	7.1	35,000	27.6	83,000	65.4	12,000
Oregon	468,200	432,200	28,992	6.7	76,369	17.7	326,839	75.6	36,000
Washington	680,000	600,000	40,000	6.7	365,000	60.8	195,000	32.5	80,000

(1) Includes Federal grant programs to State and local systems, including aid to federally impacted areas, school lunch and milk, National Defense Education Act, Manpower Development and Training Act, vocational education, Economic Opportunity Act, Elementary and Secondary Education Act, etc. ESEA revenues have generally been estimated on an anticipated cash expenditure basis at a level similar to outlays in the previous year.

(2) Includes revenue receipts from local and intermediate sources, gifts, and tuition and fees from patrons.

(3) Estimated by NEA: Research Division.

Source: National Education Association, Research Division, Research Report 1968-69. *Estimates of School Statistics, 1968-69.*

TABLE 1-12

FEDERAL ASSISTANCE TO ALASKA SCHOOLS, FISCAL 1966-71
(thousands of dollars)

Fiscal Year	School Lunch	School Milk	Pribilof Islands	P.L. 874	P.L. 815	P.L. 89-10 (ESEA)	NDEA Title: III	V	X	Head Start	Johnson-O'Malley	Rural Library	TOTAL
1966	154	37	112	7,975	533	709	125	50	36	227	708	-	10,666
1967	142	36	121	9,077	89	1,683	50	16	36	199	963	-	12,412
1968	192	34	138	7,880	34	2,442	121	46	25	3	1,006	-	11,921
1969	248	27	158	13,871	22	2,379	23	48	-	22	1,493	274	18,565
1970	328	35	181	12,187	-	2,009	123	38	-	-	2,660	197	17,758
1971	669	34	187	17,567	-	2,231	37	14	-	-	3,505	192	24,436

Source: State of Alaska, Department of Administration, Annual Financial Report

TABLE 1-13

REVENUE SOURCES: ALASKA BOROUGH AND DISTRICT SCHOOLS, Fiscal 1966-71

Fiscal Year	Local Revenues Amount ($'000)	Percent of Total	Per ADM	State Assistance Amount ($'000)	Percent of Total	Per ADM	Federal Assistance Amount ($'000)	Percent of Total	Per ADM	Total Amount ($'000)	Per ADM
1966	12,298	33	$276	21,039	56	$472	4,214	11	94	37,556	$842
1967	15,302	36	331	22,036	52	477	4,602	11	100	41,940	908
1968	17,577	38	337	24,059	51	461	5,276	11	101	46,912	899
1969	20,504	37	361	29,847	54	525	5,091	9	90	55,443	976
1970	13,395	22	220	41,947	69	688	5,363	9	88	60,704	996
1971				72,971							1,340

Source: Alaska Department of Education, Annual Report, and Department of Administration, Annual Financial Report.

for support of their schools in 1969, all but one had either lowered millage rates or eliminated them entirely by 1971. (Table 1-15) The unweighted average of tax rates for the nine districts fell from 8.4 to 3.5 mills. Three communities replaced their property tax for school support in whole or in part with a sales tax.

A climate of revolt against local taxes, and particularly against the property tax, seems to be continuing in Alaska in 1972, and local contributions to education may fall even lower. Moreover, delays and deepening uncertainty about construction of the Trans-Alaska pipeline can be expected to restrain further increases in state assistance.

TABLE 1-14

SUMMARY OF PROPERTY VALUATION, ALASKA BOROUGHS AND CITY SCHOOL DISTRICTS, 1965-1971

Year	Value $(millions)	Percentage Increase	Ratio to State Personal Income
1965	$1,262		1.48
1966	1,627	12.1	1.53
1967	1,628	15.0	1.58
1968	1,855	14.0	1.63
1969	1,960	5.7	1.55
1970	2,281	16.4	1.62
1971	2,687	17.8	

Source: Valuation-Fairbanks North Star Borough Schools; Personal Income, U.S. Department of Commerce, Survey of Current Business (August issues)

Note: State law requires assessment at full value.

1.3.4 Projection of Future Additional Funds

Concern is often expressed in Alaska that the state's apparent wealth, together with the Native Claims settlement, will work to reduce the amount of federal assistance received by the state for education. This fear is not warranted, because assistance to Alaska (other than operation of schools by the BIA) is determined largely upon formulas applicable to all the states. Although there is an area of discretion in administration of some of the assistance programs, the major ones (Federal Impact, Johnson-O'Malley, etc.) are not likely to be diminished except in response to reductions of client populations or federal activities. It should be pointed out here, however, that the share of federal funds in the support of public education in Alaska has been declining, and will continue to decline.

The situation described here is one of rapidly shifting sources of school support within the state and local sector, in the absence of any tradition of tax rate stability.

TABLE 1-15

ALASKA SCHOOL DISTRICTS TAX RATES FOR SUPPORT OF SCHOOLS

DISTRICT	Property tax (mills)			Sales tax (percent)
(City and/or Borough)	1969	1970	1971	1971
Anchorage	10.58	10.27	6.77	--
Fairbanks	15.2	8.9	4.5	--
Juneau	4.44	3.8	--	1.0 (new)
Ketchikan	--	1.62	1.72	.45
Kodiak	3.05	2.73	4.3	--
Kenai	--	3.5	3.5	3.0
Sitka	3.0	--	--	1.0 (new)
Nome	12.3	5.3	6.3	--
Wrangell	--	--	--	--
Petersburg	--	--	--	--
Cordova	--	--	4.0	--
Valdez	7.25	9.7	5.5	--
Dillingham	5.0	1.0	.5	2.0
Yakutat	--	10.0	10.0	--
Bristol Bay	--	7.98	8.8	--
Haines	6.5	5.0	3.5	--
Nenana	--	--	8.0	2.0
Skagway	--	3.8	--	--
Unalaska	--	2.0	--	--
Kake	--	--	--	--
Klawock	--	--	--	--
Craig	--	--	--	--
Hydaburg	--	--	--	--
King Cove	--	--	--	--
Pelican	--	--	--	--

Source: Fairbanks North Star Borough School District

State appropriations, which are now more than two-thirds of total school support, are very sensitive to the legislature's expectations regarding future oil and gas revenues. Moreover there is evidence of a lack of political consensus or equilibrium in the state regarding the role or importance of public education. In this context, projections of future educational revenues are hazardous. Absolute outlays for schools are not likely to decline, but per capita or per pupil real (constant dollar) expenditures cannot continue to increase at their 1969-71 rates, and may even retreat. The best assumption for planning may be that per capita or per pupil rates will remain nearly constant in real terms[18] at least until there is a strong indication that North Slope oil and gas will indeed be produced. New educational programs (such as an education telecommunications network) will have to compete with the objectives of reducing pupil-teacher ratios, increasing teacher real salaries, and the adequate maintenance of existing capital. The commencement of pipeline construction might not have as radical an effect on legislative appropriations as did the 1969 lease sale, but it would probably permit current expenditures to increase roughly with the state gross domestic product (or personal income).

Two reasonable reference lines for planning of educational facilities can be based upon alternate assumptions (1) that there is no employment growth (and consequently no significant population growth) in Alaska but that real per capita productivity grows at 3 percent annually, and (2) that the impacts of pipeline constructions and Arctic oil production will be as projected in the Alaska Pipeline Report (with individual figures lagged one year to correspond with delays to date). In Table 1-16 it is assumed that 5 percent of the growth of income due to productivity increase is made available for public education, and ten percent of the increase attributable to the Prudhoe Bay oil economy. These assumptions project an additional $24 million for schools in 1980 without employment growth (corresponding to the Low Case in the population projections), and $70 million if the pipeline is built one year behind schedule (corresponding to the High Cases in the population projections). It should be emphasized here that these figures do not exhaust the range of plausible alternatives; the available funds conceivably could be substantially less or more than indicated here. It should also be noted that future salary increases, even those required to keep pace with the rest of the economy, will have to be financed from these increments.

TABLE 1-16 ADDITIONAL FUNDS AVAILABLE FOR PUBLIC SCHOOLS IN ALASKA
(millions of dollars in excess of 1970 level)

Assumptions	1975	1980	1985	1990
No new employment	11	24	36	56
Pipeline construction and operation	50	70	84	104

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[18] A constant per capita outlay would permit some increase in per pupil spending, because of the lower birth rates of recent years.

1.4 FORCES FOR CHANGE IN ALASKA'S ECONOMY

1.4.1 Petroleum and the Pipeline Issue

The most powerful potential instrument of change in Alaska's economy is the discovery and production of oil and gas. The impact, current and potential, of the Prudhoe Bay discovery has been indicated in the previous section. (See particularly Table 1-4). It is reasonable to believe, however, that many more billions of barrels of oil will be discovered and produced in the state than have yet been discovered. Some of the reasons for this assessment follow: As the Prudhoe Bay field development nears completion, proved reserve estimates for that field will almost certainly rise, since current estimates are based on the most conservative interpretations of existing knowledge. Large petroleum accumulations of the Prudhoe Bay variety have never been known to exist in isolation; they are typically associated with a group of smaller accumulations, and large structures of Prudhoe Bay magnitude are known to exist elsewhere in the province.

In the six major geological provinces of Alaska considered prospective for petroleum, only the Cook Inlet area (near Anchorage) has been explored with any completeness. Even there, a land ownership dispute between the federal and state governments has held up exploratory activity. The southern half of the basin, which contains half to three-quarters of the region's favorable structures, has yet to be tested with the drill. Only about five percent of the onshore and accessible portion of the Gulf of Alaska province has been fairly extensively drilled; the remaining 95 percent is virgin. (ANNEX A-2, SR. No. 10—Chapter III)

In general, the oil and gas industry is among the most capital intensive of all major industries, and in relation to the value of its production, the employment created is relatively small. Because of the high productivity of Alaska wells and the absence of the system of "market demand prorationing" that encourages unnecessary drilling in other oil states like Texas and Louisiana, petroleum offers even fewer jobs per million dollars of investment or production than it does in the United States generally. Moreover, geophysical exploration personnel, drilling workers, pipeline welders, divers, helicopter operators and the like, are specialized workers operating in national or international labor markets and are highly mobile. Accordingly, petroleum activities in new areas are likely to be staffed overwhelmingly with transients or immigrants.

The major development impact of the discovery of oil and gas is likely to be in the form of lease bonuses and royalties to the landholder, whether it is the state, the federal government, or a Native corporation. A typical lease contract provides that the owner will receive a royalty of 12.5 percent of the wellhead value of any oil and gas produced from the leased acreage. The prospective value of a given lease can vary enormously depending upon geological and geophysical indications of the probable occurrence, abundance and cost of producing oil and gas. For this reason, a cash "bonus" is often paid to the owner of particularly promising acreage, in addition to royalties depending upon the value produced. The huge payments by oil companies to the state of Alaska in 1969 were such bonuses; each lease was awarded to the company that offered the greatest bonus in a sealed bid auction. "Rentals" are usually charged on a per-acre basis.

The bulk of the prospective acreage for oil and gas in Alaska is currently and will remain under state or federal ownership. The state of course receives all of the revenue from its own lands, but it also gets nine-tenths of the leasing revenues from federal onshore leases in Alaska. (Both these revenue flows, however, are subject to a prior payment to Alaska Natives of two percent of the value of bonuses and rentals, and two percent of the value of minerals produced up to a total of $500 million, on federal lands and on lands transferred from the federal government to the state after 1971.) The state also levies a production tax of four to eight percent, depending on the productivity of individual wells, on all oil and gas produced in the state, whether from federal, state, Native or other private lands. For this reason, the state will receive the bulk of the local benefits from oil and gas development in the form of cash revenues, and the Native corporations established under the Alaska Native Claims Settlement Act will also share, both through their interests in federal and state leases, and through the lands awarded them in the Act.

1.4.2 Native Land Claims Settlement Act

The claims settlement legislation granted 40 million acres of public lands to the various Native villages in Alaska, and between seven and twelve regional Native corporations (yet to be established), corresponding to the current regional Native associations. The location of much of this land is determined by the location of the Native villages to which they are awarded, but several million acres may be selected within a wide choice of locations, and will presumably be selected principally for commercial resource values. Of all the potential commercial resources, only oil and gas are likely to have very large dollar values (in the order of millions), and it is probable that most villages and regional corporations will be land-rich but resource-poor. There will, however, be individual instances in which timber, fisheries, metallic minerals, or tourism will provide the base for Native employments and perhaps land-owner remittances.

The Act also provided for payment to the regional and village corporations of $965 million from the federal treasury over a period of nine years, and the share of mineral revenues previously mentioned, until they reach $500 million. This flow of cash, much of it into the villages, will have a perceptible impact upon the Natives' material welfare, but its ability to initiate sustained economic growth in most rural areas is open to question. It is doubtful whether there are many resources in rural Alaska, natural or human, that are presently unemployed simply because of the lack of local venture capital or the lack of the kind of social overhead customarily provided by municipal governments. The probable impact of money from the Native claims settlement is that life in the villages will become more modern and more comfortable, and that it will become easier, materially at least, to maintain some semblance of traditional life styles. Most of the additional income will be used either for consumption or for investment, health, education and other aspects of human capital.

Experience has shown that the Natives with higher educational attainments, those who do or are capable of earning higher cash incomes, tend disproportionately to leave the villages. Whether or not this past trend will prevail over the tendency of the claims settlement to improve the material aspects of village life, is impossible to forecast with confidence. In view of the vast diversity among the villages of Alaska in resource endowment, culture, current level of acculturation to non-Native urban ways, and morale: different groups of Natives and different villages will show vastly different responses to the outcome of the claims settlement legislation.

1.4.3 Other Economic Base Developments

Currently, important resource industries in Alaska other than oil and gas are wood products, fisheries and tourism. Also, the sheer size of the state and its geological diversity suggest that metallic mining must offer developmental opportunities in various parts of the state. All the industries mentioned here are almost certain to grow, but their potentials as bases for rapid economic expansion are subject to significant constraints. Alaska's commercial forest land is vast, but most of the potential timber production is in the southeast part of the state, and almost three fourths of that capacity is already committed to a production plan. Likewise, there are large fisheries resources off Alaska's coasts that are presently unexploited (or exploited only by foreign fleets), but the most valuable species, like salmon and king crab are already being harvested at nearly, if not beyond, their long term sustained yield capacity. The growth of other fisheries might yield great increases in tonnages, but the growth of income and employment would not be proportionate.

The mineral resources of Alaska other than fossil fuels are not well known, but the notions that the state is a vast treasurehouse of ore, waiting only new roads, or cheap power, or Statehood, and that a huge mining boom is around the corner, have proved illusory too often to be considered without skepticism. Of all the resource-based industries other than petroleum only tourism seems to be without a significant early limit to growth.

1.4.4 Deepening of the Economic Support Sector

Substantial growth is in prospect for Alaska's economy, however, even if the pipeline project is delayed and if no new oil discoveries or other expansion occurs in the state's economic base. This growth is even now occurring because of a deepening of the support sectors of the regional economy, principally trade and services. This growth, however, is occurring, and likely will continue, mainly in the Anchorage area.

Table 1-17 shows population figures for the Anchorage area from the 1960 and 1970 regular population censuses and the 1968 special census, and estimates based upon 1971 house counts. The data show a surprising acceleration of population growth over the period; the largest relative increase was in 1970-71. This growth occurred despite stagnation in the military component of Anchorage's economic base, and despite a decline in oil industry activity after 1968-69. Other indicators of growth show a similar acceleration, unrelated to any significant increase in the economic base. For example, gross receipts in construction, real estate

TABLE I-17 ANCHORAGE AREA POPULATION GROWTH, 1969-1971

Year	Population	Annual Rate of Growth
1960	80, 324	4. 8 (from 1950)
1968	108, 467	3. 8
1970	120, 191	4. 8
1971	132, 037	9. 9

and finance in the Anchorage area were recorded at $157 million in both 1966 and 1967, $187 million in 1968, $208 million in 1969, and $609 million in 1970, increases of 0, 9, 11 and 193 percent respectively.

One force for growth has been the steady encroachment of Anchorage as the principal market and financial center for all of Alaska except the southeast region, at the expense both of Seattle and of regional centers in Alaska. At the same time, there has been a chronic deficiency in the quantity and quality of Anchorage's capital assets, residential, commercial and public alike. In housing, for example, the 1960 median number of rooms per housing unit was only 3. 6 in Anchorage, compared to a national average of 4. 9. By 1970, the Anchorage median had advanced to 4. 6 rooms per unit. Another indicator of the housing lag is the proportion of housing units occupied by more than one person per room. The Anchorage figure was 21 percent in 1960; it had fallen to 13 percent by 1970, but the United States average was only 3 percent in 1960.

Both a chronic deficiency and a catching up process can be seen in indicators of business activity in the United States Census of Business. Similar findings could be offered showing deficiencies in the development of banking and public facilities such as paved streets, sidewalks, water and sewer systems. The recent acceleration of the catching-up process is explained in part by the mutual relationship between a deficiency in services and facilities in Anchorage, and the high costs of living and of doing business. The regional economy has been caught in a vicious circle in which high costs and facilities deficiencies were major causes of each other. High costs and prices, particularly in construction, were a deterrent to the business expansion and the investment in public facilities that would have brought down costs. Progress was very slow in both realms in the fifties and early sixties, but the growth of Anchorage's economy, and a decline in its cost handicap, have progressed together and drawn strength from each other, especially within the last five years. The total cost of an intermediate level family budget fell from 143 percent of the national urban average in 1960 to 136 percent in 1971, but five out of seven percentage points in the fall are attributed to the last two of the eleven year period.

As was suggested earlier with respect to housing and business activity, there is still much catching up to do, and this catching up may sustain economic expansion in the Anchorage area for several years even if no major new developments, like completion of the TransAlaska pipeline, inject new income into the state's economic base. Similar growth and cost reductions elsewhere in the state are harder to see, and these developments may accelerate the concentration of the state's economic life in Anchorage.

I.5 SUMMARY AND CONCLUSIONS

The preceding pages have considered the circumstances and the dynamics of Alaska's population and economy. Special attention has been given to those factors that would affect the demand for educational telecommunications services and the ability of state and local government to finance them, in particular the rural population in future years, and the appropriations of public funds for education. Both factors are subject to great uncertainty, stemming from the future of the oil and gas industry in Alaska and the response of the Native population to the changes induced by the Alaska Native Claims Settlement Act of 1971.

Subject to these and other uncertainties, the most probable range of eventualities for (1) total population and Native population in the remote areas of the state (those 1970 census divisions not served by any portion of the continental highway network or the Alaskamarine highway system), and (2) additional public funds appropriated for public education, were projected as in Table 1-18. The differences between the low and high sets of figures for school-age population are not large in absolute terms, nor do they represent radical advances over current conditions. This outcome reflects mainly the assumption that the most recent birth rate figures are more representative of the future than those of five or ten years ago.

In viewing the figures in Table 1-18, it should be kept in mind that it is out of the additional funds available for public education that future increases in teacher salaries, as well as any new capital equipment or new programs, must come.

TABLE 1-18

SUMMARY PROJECTIONS OF SCHOOL AGE POPULATION AND SCHOOL FINANCES, 1975-1990

	1975	1980	1985	1990
Total school age population, Alaska (thousands)	74-97	72-98	73-97	78-102
Rural school age population (thousands)	14-17	13-17	14-17	12-17
Rural Native school age population (thousands)	9-11	8-10	7-11	7-13
Additional funds for public education (millions)	$11-50	24-70	36-84	56-104

Source: Tables 1-15 to 1-9 and 1-16

In viewing the figures in Table 1-18, it should be kept in mind that it is out of the additional funds available for public education that future increases in teacher salaries, as well as any new capital equipment or new programs, must come.

CHAPTER II

A SURVEY OF EDUCATIONAL REQUIREMENTS

2.1 INTRODUCTORY REVIEW

A communications network extending to the most remote region of the state is essential for the educational future of Alaska. Marjorie Lynch, a federal official charged with improving the coordination of federal programs in the northwestern states, recently stated that the natives of Alaska are being pushed into the twentieth century without any means of coping with the situation in which they find themselves. She also noted that vast distances and limited communications between rural communities, including the shortage of telephones, contributes to a "poverty of isolation" which must be overcome.[1] As Cassirer and Wigren point out, "In many respects, a satellite was 'invented' for Alaska because of Alaska's unique communications problems, lack of terrestrial communications facilities, mountaninous terrain, harsh climate and sparse population . . . It is an ideal system of reaching all parts of the state on a real time basis."[2] While this study explores systems in addition to satellites, their unique potential for Alaska is noteworthy.

In addition to the communications problems existent in a vast geographical area with a sparse population, problems of isolation, and limited local community resources, significant educational policy changes on the part of state educational agencies have occurred in the past few months which support the requirement for facilities to provide additional educational and health resources to remote communities—resources which can be made available through telecommunications.

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[1] Associated Press News Release, reported on KFRB, Fairbanks, Alaska, March 16, 1972.

[2] H. R. Cassirer and H. Wigren, "Alaska: Implications of Satellite Communications for Education," Serial No. 2198/BMS.RD/MC (Paris: UNESCO, November, 1970, p. 2. (Mimeographed.)

Traditionally, minimum enrollments have been required for the establishment and operation of high schools.[3] However, the prevailing philosophy has encompassed the concepts that a comprehensive high school should provide an educational program broader than that minimally required by the state and ideally should be located in a population center larger than the size of the typical rural community in order to offer attractive electives, a qualified staff with appropriate areas of specialization, and opportunities for rural students to avoid some of the constraints of extreme isolation inherent in their home towns.

Consequently, many students desiring a secondary school education have been forced to leave their home villages. They either attend boarding schools where they reside in dormitories or enroll in urban schools and live with foester parents who receive a stipend from the State. For example, during the 1971-72 academic year, 267 students are enrolled in the Boarding Home Program in Fairbanks, and 530 are currently living with boarding home families in Anchorage. Similarly, 438 students reside in dormitories in Sitka (attending Mr. Edgecumbe Boarding School which is administered by the Bureau of Indian Affairs), 152 in Kodiak, and 160 in Nome.[4]

As a result of growing concern on the part of parents that their children should receive an education closer to their homes,[5] coupled with a full realization of the many dangers and limitations of an educational program which encourages dislocation of children from their parents at a relatively early age, a major policy shift by the State educational agencies has occurred. The new policy provides for the establishment of small local high schools in communities which do not presently have these facilities.[6] As a result of this policy decision, the increased importance of a communications network which can provide educational resources to remote communities cannot be overemphasized. Technology can be utilized to share scarce resources, make possible a broader program, offer attractive electives via TV and tape, and share specialized staff.

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[3] According to law, elementary schools may be established when ten children between the ages of six and sixteen reside within a radius of one and one-half miles of the proposed school site. Special secondary schools may be established in connection with an existing elementary school where twelve or more eighth grade graduates reside, if they will enroll and attend school regularly. (Bylaws for the State Board of Education, pp. 9-11.) In fact, however, most locally established and maintained schools providing four years of secondary education enroll one hundred or more pupils. Exceptions do exist, such as Craig-Prince of Wales High School with only thirty-nine students, Seldovia High School with only thirty-four, Healy-Tri Valley High School enrolling forty-two, and Cape Pole High School with an enrollment of only twenty-six pupils in grades one through twelve. 1971-72 Alaska Educational Directory, (Alaska Department of Education), pp. 36, 63, 116, 103.

[4] Information supplied by Mrs. Betty Magnuson, Home School Coordinator--Fairbanks, Division of Regional Schools and Boarding Home Program, Alaska Department of Education, February 2, 1972.

[5] An interesting and possibly a future landmark case for legal action was recently initiated against the State Board of Education in Alaska. Parents and friends of four school-aged children in Kivalina, Alaska, a community of 188 inhabitants, brought action to force the State to provide secondary education for these children in the community of Kivalina. The plaintiffs claim that they are guaranteed the right to education in their home community by the Alaska Constitution and by state statute. (Lucille Sage, et al. vs. Alaska State Board of Education, Superior Court for the State of Alaska, Third Judicial District, Case No. 71-1245, April 28, 1971).

Serious technical problems persist as to the type of communications system which will best suit Alaska's peculiar conditions. Yet, a potentially more serious problem lies in the determination of educational and health needs for rural Alaskans which can be translated into services compatible with the capabilities of a telecommunications system. History is replete with examples of early mastery of technical communications problems, followed by the realization that little of substance exists to communicate.

Myriad studies, records of hearings and needs assessments exist which deal with the educational and health needs of rural Alaska. Because only a few prominent rural Alaskans have been asked so many questions by outsiders, resistence has developed toward more studies, and an unhealthy cynicism toward research now persists.. In the minds of many rural inhabitants, it is a foregone conclusion that nothing of importance will develop from additional study of Alaska's educational and health problems. As one Alaskan native leader succinctly stated, in recent Senate hearings on Indian education, "We don't want to be studied. We just want Manhattan back."[7] Partially because of this resistance to "another study" and more importantly because of the conviction that adequate raw data exist for the establishment of rural educational and health needs, the primary approach utilized in establishing educational and health priorities will be to analyze existing information coupled with field testing of tentative conclusions with Native leaders at the local, state and national levels.

2.2 PERSISTENT EDUCATIONAL NEEDS AT ALL LEVELS

While most Alaskans and those residing outside Alaska tire of the cliches pertaining to Alaska's uniqueness, distinct differences do exist in the problems found in rural Alaska in comparison with those found elsewhere in the United States. Conversely, many problems common to those found in other states can be identified. Similarly, within the state, sharp regional differences occur, although common concerns and demands are more prevalent than are those needs that are distinctly different.

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[6] Alaska Department of Education, Annual Report, 1970-71 (Juneau, Alaska: Alaska Department of Education, Office of Public Information and Publications, December, 1971), p. 3.

[7] U. S. Congress, Senate Committee on Labor and Public Welfare, Hearings Before the Subcommittee on Indian Education, 91st Congress, 1st session, 1969 (Washington, D. C. : Government Printing Office, 1969), p. 562. (Hereinafter referred to as Hearings on Indian Education.)

Consideration will be given first to common, persistent needs in all regions of the state, initially categorized by age groupings into early childhood or pre-school, elementary (ages 6-12), secondary (ages 13-18), and adult (which concern the rural population over eighteen years of age as well as the in-service training needs of professional educational personnel).

As prevailing needs exist which apply to each region of the state, so do common needs accrue which cut across all age levels and categories suggested. However, to avoid repetition, needs which apply with greatest importance to a specific group will be discussed under the appropriate heading.

2.2.1 Early Childhood Education

The cruciality of a child's early years as they influence or determine his later development is hardly open to argument. Benjamin Bloom contends that fifty percent of a child's intellectual capacity has been developed prior to the age of four. Considerable data from the works of Bruner, Hunt, Montessori and Piaget provide basic information related to social and cognitive development of children.

A committee to plan for early childhood education in Alaska was established in 1970 under the leadership of the Northwest Regional Educational Laboratory. Members of this committee included representation from the Alaska Federation of Natives, the Alaska Department of Education, the Northwest Regional Educational Laboratory, Rural Alaska Community Action Program, the Alaska Division of State-Operated Schools, and the University of Alaska.

The members of the consortium agreed that children's needs might be divided into two categories: (1) development of a healthy self-concept as it relates to learning in the school, community, and home; and (2) the development of intellectual ability.[8]

This group further developed eight specific needs for early childhood education as well as specifying learning activities designed to meet these objectives. The objectives and activities are depicted through the attached matrix design (Table 2-1). Additionally, each of the eight needs is presented with appropriate descriptive objectives (Table 2-2).

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[8] Verna C. Rogers and Robert R. Rath, "Alaskan Models for Early Childhood Education", (Portland, Oregon: Northwest Regional Educational Laboratory, June, 1971). (Mimeographed.) The information included in Tables 2-1 and 2-2 has been reproduced from this publication.

TABLE 2-1
EARLY CHILDHOOD LEARNING OBJECTIVES AND ACTIVITIES MATRIX

Objectives / Activities	Socio-Emotional			Perceptual-Motor			Cognitive	
	A	B	C	D	E	F	G	H
	Good mental and emotional health (self-concept)	Social competency	Creative self-expression	Cultural Understanding	Self-direction	Good health and physical well-being	Broaden intellectual horizons (expand concepts)	Communication Skills and language development
Learning about self	X		X	X	X	X		X
Learning about family	X	X		X			X	X
Learning about community	X			X			X	X
Learning about food and nutrition						X		X
Learning about clothing						X		X
Learning about plants and animals							X	X
Learning about art materials	X		X		X			X
Learning about playground equipment		X			X	X		X
Learning about colors, shapes and sizes							X	X
Learning about toys, games and Equipment	X	X			X	X	X	X
Learning about class members	X	X		X			X	X
Learning about books and words							x	x
Learning about folk tales and legends	X		X	X			X	X
Learning about numbers							X	X
Learning about spacial concepts (over, under, etc.)							X	X
Learning about relational concepts (longer, shorter, etc.)							X	X

TABLE 2-2

EARLY CHILDHOOD LEARNING OBJECTIVES AND ACTIVITIES MATRIX

A. NEED: To help each child build and maintain a positive self-concept.

Objectives:	Activities:
Frequent success experiences	Furnish frequent chances for success attuned to his own level of growth and development
Positive, self-correcting feedback from adults, children and materials	Encourage the child to learn about self through the use of many types of materials, equipment, and activities
Association with responsive adults	Surround the child with adults who respect and understand individual differences, human dignity and the need for achievement
Enrich cultural heritage	

B. NEED: To help each child to develop social competency

Objectives:	Activities:
Learning from adult models	Thoughtful, sincere adults to act as models for children to follow
Large and small group living skills	Time for learning about self and others through group living - to learn how one's behavior is accepted by others - to learn how different behavior affects individuals and groups as a whole - to learn about self through the guidance of adults trained in early childhood education

TABLE 2-2 (Cont'd.)

	Time for learning specific social amenities - learning to listen to others - learning to take turns at sharing equipment and materials - learning through the use of audiovisual materials - learning to be courteous and thoughtful of others
	Children to assume responsibility for assisting in such things as table setting, cleaning up their "messes" and reshelving toys
	Freedom to solve interpersonal conflicts without immediate adult interference

C. NEED: To provide each child with the opportunity for creative self-expression

Objectives:	Activities:
Self-expressing, creative activities	Self-development through the use of a variety of art and music experiences
Aesthetic experiences in art, music, etc.	Learn about arts and crafts through field trips, special visitors, and audiovisual materials

D. NEED: To help each child develop cultural understanding and appreciation

Objectives:	Activities:
Parental involvement in policies, practices, decision-making, and teaching of early childhood education	

TABLE 2-2 (Cont'd.)

Preparation for responsible citizenship	Time for learning democratic principles through experience, books, audiovisual materials, class and school rules and regulations, and teacher attitudes and models
To appreciate the world around them	Opportunities to learn about the immediate neighborhood and surrounding community through field trips, classroom visitors, audiovisual materials

E. NEED: To help each child develop a sense of self-direction and responsibility

Objectives:	Activities:
Self-discipline	Time and freedom to learn through living within the educational environment - opportunity to experiment with adult standards through dramatic play - opportunity to experience other children's standards of behavior
Self-directing, problem-solving activities	Opportunities for making choices throughout the daily program between a variety of activities and materials

F. NEED: To help each child acquire and maintain health and physical well-being

Objectives:	Activities:
Diagnose and correct individual health problems	
Provide nutritious meals and snacks	Learning about nutrition through involvement in planning and preparation of meals and snacks

TABLE 2-2 (Cont'd.)

Establish good personal health habits	
Provide physical activities which promote muscular development	Scheduling intermittently, activity and quiet periods in the daily schedule Opportunity for large muscle development - use of specifically designed equipment and play areas - use of rhythmic activities, games, stunts, etc. Opportunity for small muscle development - use of selected equipment and supplies for manipulation purposes - use of finger plays Romping, zestful self- releasing physical activity

G. NEED: To help each child develop knowledge and broaden intellectual horizons

Objectives:	Activities:
Develop knowledge and learning skills	Time for adults to observe children and to give each individual the affection, acceptance, achievement, and authority needed for his self-improvement Preplanned curriculum which makes provisions for individual differences and offers challenges for each child The development of knowledge and understanding through the use of books, adult visitations, audio-visual materials, field trips, etc.

TABLE 2-2 (Cont'd.)

	Incidental learnings during the daily routine which give experience in arithmetical concepts, scientific learnings and reading readiness
	Planned interest centers with appropriate materials for concept formation, dramatic play, manipulative play, etc.

H. NEED: To help each child develop communication skills

Objectives:	Activities:
Communication with adults	Time for communication with adults - time for planning, evaluation and informal discussions - time for listening to records and tapes - time for listening to stories being read or told - time for the use of audiovisual equipment
Peer interaction	Time for interaction with peers throughout the daily schedule - time for dramatic play - time for informal group experiences - time for developing experience charts - time for singing and choral speaking activities
Language concept development through listening and speaking	Time for entering into planned language development activities - listening games - labeling activities - using tape recorders and language masters - picture reading activities

Numerous studies concerning education in Alaska have strongly underscored the necessity for developing programs of early childhood learning. For example, the Brookings Institution endorsed the creation of programs designed to enrich the early childhood experiences of pre-school chidren in Alaska.[9] And Emil Notti, former president of the Alaska Federation of Natives (AFN), has called for kindergarten or Headstart programs in all villages in the state. Such programs are so essential, he argues, that they should be implemented immediately.[10]

While many of the needs identified in the area of early childhood education are common to all children, Alaska's rural children have particular deficiencies which children in middle-class setting do not typically have and which can only be diminished through appropriate educational programs. Critical needs which are especially pressing include improvement of communications skills, development of a positive self-concept, and opportunities for establishing social competencies.

An excellent survey of language skills possessed by students entering the primary grades in rural schools was conducted for the Alaska Department of Education by J. B. Carruthers. Figure 2-1 depicts percentages of children entering rural schools who speak only native languages, native languages and English, etc.[11] While such percentages are important, a more crucial measure from the same study provides a village-by-village breakdown of language patterns of young children and their parents. For example, not a single child entering school in Tooksook Bay, located near Nelson Island, spoke English in the classroom. On the other hand, in Beaver, a village on the Yukon River, all students entering school spoke English and used this language in preference to their native language in school and on the playground.[12] Further breakdown of the differences which exist from school to school and region to region is illustrated by Tables 2-3 and 2-4.[13]

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[9] Legislative Council of the State of Alaska and the Brookings Institution. A Conference on the Future of Alaska, (Seminar Four, "Alternative Futures for the State of Alaska", 1970) Alpha Section, p. 452.

[10] Hearings on Indian Education, p. 451.

[11] J. B. Carruthers, Language Survey of Entering Primary Students (Alaska Department of Education, May 1970), p. 3.

[12] Ibid., pp. 10-12.

[13] Ibid., p. 6.

FIGURE 2-1

LANGUAGE PATTERNS OF ENTERING STUDENTS
AND PARENTS OF ENTERING STUDENTS

RURAL ALASKA – 1969

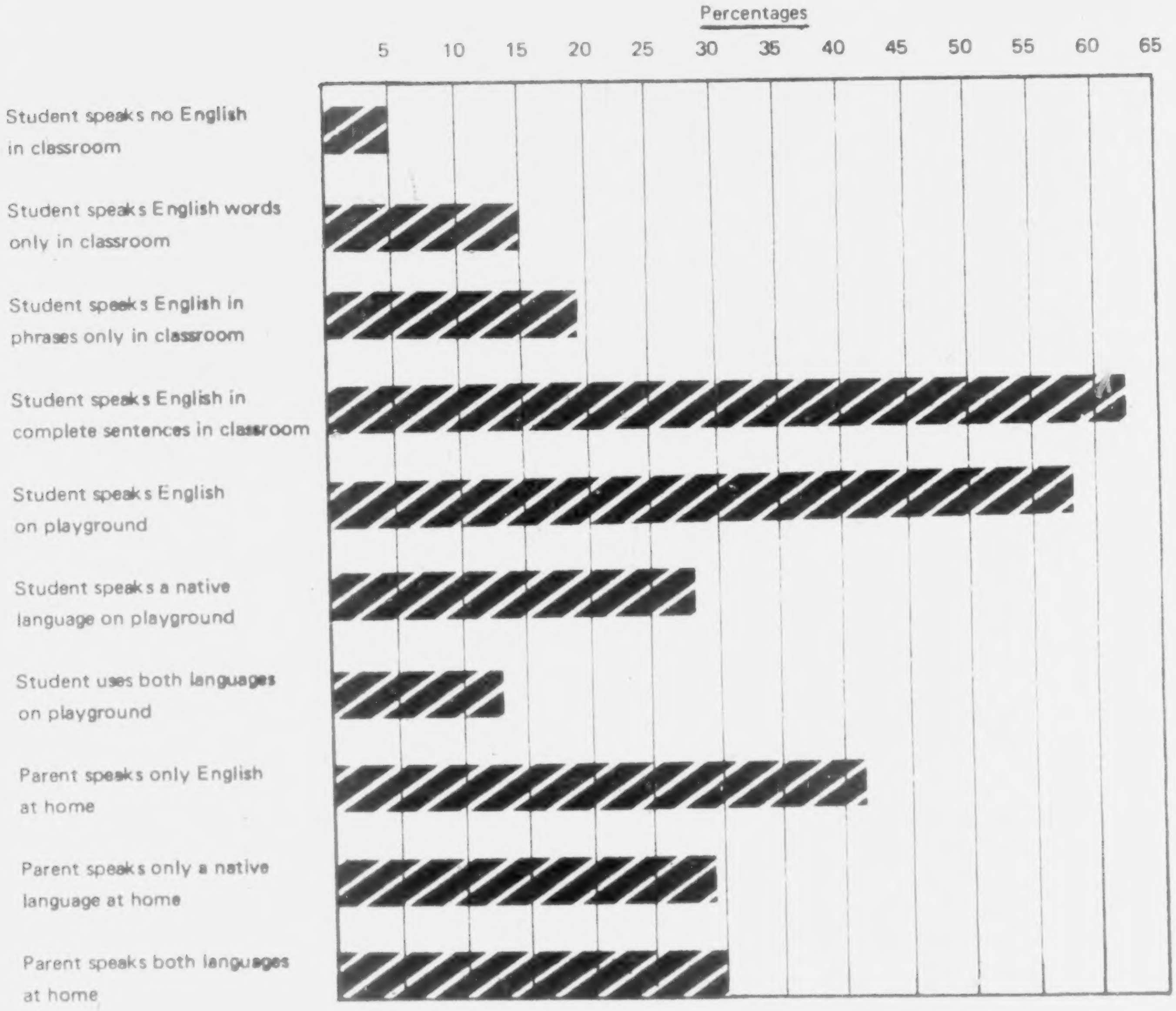

TABLE 2-3

SURVEY OF LANGUAGE USED ON THE PLAYGROUND BY ENTERING STUDENTS

	Language Used on the Playground by Entering Students									
	English		Native		Both		NR **		Total	
Schools	N *	%	N	%	N	%	N	%	N	%
17 SOS schools reporting that some entering students do not speak English in sentences	107	87.7	9	7.4	5	4.1	1	.8	122	100
40 BIA schools reporting that some entering students do not speak English in sentences	112	27.1	211	51.0	90	21.7	1	.2	414	100
57 Total SOS and BIA schools reporting that some entering students do not speak English in sentences	219	40.9	220	41.0	95	17.7	2	.4	536	100
20 SOS schools in which all entering students do not speak English in sentences	145	100							145	100
18 BIA schools in which all entering students do speak English in sentences	140	87.5	15	9.4	5	4.1	1	.8	160	100
38 Total SOS and BIA schools in which all entering students do speak English in sentences	285	93.5	15	4.9	5	1.6			305	100

* N = Number of Students

** NR = No Response

TABLE 2-4

SURVEY OF LANGUAGE USED BY PARENTS OF ENTERING STUDENTS

Schools	Language Used by Parents of Entering Students									
	English		Native		Both		NR**		Total	
	N*	%	N	%	N	%	N	%	N	%
17 SOS schools reporting that some entering students do not speak English in sentences	85	69.7	9	7.4	25	20.4	3	2.5	122	100
40 BIA schools reporting that some entering students do not speak English in sentences	52	12.6	212	51.2	150	36.2			414	100
57 Total SOS and BIA schools reporting that some entering students do not speak English in sentences	137	25.6	221	41.2	175	32.6	3	.6	536	100
20 SOS schools in which all entering students do speak English in sentences	133	91.7	2	1.4	9	6.2	1	.7	145	100
18 BIA schools in which all entering students do speak English in sentences	75	46.9	16	10.0	69	43.1			160	100
38 Total SOS and BIA schools in which all entering students do speak English in sentences	208	68.2	18	5.9	78	25.6	1	.3	305	100

* N = Number of Students
** NR = No Response

2.2.2 Elementary Education

Educational needs described under the category "early childhood" also apply to children in the elementary age group, although additional requirements and expectations accrue.

In studies of Alaskan native education initiated over fifteen years ago and continuing at an accelerated pace today, Eskimo and Indian parents have responded to the question, "What do you want your children to learn?" And with considerable consistency, parents have replied in a similar vein, although, as one would expect, the order of educational priorities differs markedly from individual to individual and from region to region. The conclusion in Ray's research, conducted in the late 1950's and early 1960's[14] are consistent with current findings in such reports as "Time for Change in the Education of Alaska Natives,"[15] "'First Generation' and Competency-Based Teacher Training",[16] "The Identification of the School Board Training Needs of Eskimo and Indian Lay Advisory School Board Members of Rural Alaska,"[17] Indian Education: A National Tragedy —A National Challenge,[18] and Directions 70's: An Assessment of Educational Needs in Alaska,[19] to mention only a few germane studies.

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[14] Charles K. Ray, A Program of Education for Alaska Natives, Rev. ed. (College, Alaska: University of Alaska, 1959); Charles K. Ray, et al., Alaskan Native Secondary School Dropouts (College, Alaska: University of Alaska, 1962).

[15] Governor's Commission on Cross-Cultural Education, "Time for Change in the Education of Alaska Natives" (A Statement of Preliminary Findings and Recommendations Relating to the Education of Alaska Natives Prepared for Governor Keith H. Miller, February 1970). (Mimeographed.)

[16] C. D. Rider, "'First Generation' and Competency-Based Teacher Training: Comments and Recommendations" (Anchorage, Alaska: Alaska Methodist University, January 13, 1972). (Mimeographed.)

[17] Miles L. Coverdale, "The Identification of the School Board Training Needs of Eskimo and Indian Lay Advisory School Board Members of Rural Alaska" (Unpublished doctoral dissertation, Utah State University, Logan, Utah). (Mimeographed)

[18] U.S. Congress, Senate, Committee on Labor and Public Welfare, Indian Education: A National Tragedy--A National Challenge, A special report of the Subcommittee on Indian Education, 91st Congress, 1st Session, on S. Res. 80, November 3, 1969, Report No. 91-501 (Washington: Government Printing Office, 1969). (Hereinafter referred to as Indian Education: National Tragedy.)

[19] Norma S. Bowkett, comp., Directions 70's: An Assessment of Educational Needs in Alaska (Alaska Department of Education, August, 1970).

Without exception, parents and community leaders demonstrate a pragmatic bent and rank high in order of importance the teaching of basic skills to all children. These tools of learning include communications skills (reading, writing, speaking, listening) as well as basic concepts in the areas of arithmetic, science, and social studies. Language development and reading competency are typically ranked as most important. More recently, requests for competency in social studies focus on cultural history, ethnic identification, and man's interrelationships. Related skills in native art, music and dance are also stressed today, whereas these areas of study were seldom mentioned a decade ago.[20] The requests for culturally relevant courses or learnings indicate an implicit, if not expressed, recognition that children must learn to be proud of their heritage, and consequently have pride in themselves. Parents and community leaders recognize the difficulties facing rural youth who must choose between accepting a traditional life style or learning to exist in a culturally foreign environment. More sophisticated rural adults see prospects for increasing pupil motivation through a closer relationship between school learning and life.

Another recurring theme stressed by villagers in considering the educational needs of rural Alaska children is the lack of opportunity to prepare for making an adequate living. No one is unaware of the economic changes that have occurred in Alaska in recent years which have rendered the hunting and fishing economy obsolete as a sole means of livelihood. A major justification for teaching basic skills is a recognition that such skills are essential for further study or for holding salaried positions. Beyond the obvious statement of desire by parents and community leaders that children be prepared for earning a living, specific information about career education must be provided to pupils beginning as early as the primary grades. Information about the nature of specific jobs and the training and preparation required for various careers, as well as an indication of potential fields of job surplus and shortage is essential.

Specific training of a vocational nature in the elementary school grades is premature (unless one defines fundamental academic tool subjects as vocational preparation). However, exploratory information dealing with the work requirements in a technological society is necessary, especially so in light of the vocational aspirations of adults and children alike and the recognition that youth must be prepared to work.

Difficult to quantify but persistent as a recurring educational need is the creation of curiosity, or the desire to continue to learn. To many students and to their parents, the formal classroom is a deadly place. With varying degrees of explicitness, we hear the call of a "new kind" of education which will shift the emphasis from rote learning and from the teacher as conveyor of knowledge to the involvement of the pupil in his own learning. "Kids should want to go to school and they don't. I don't know why the school can't be a place people want to be," a Minto parent commented recently.[21] And from Tanana, in response to the query about what should be the school's role, came the statement that pupils should be taught to keep learning—they should be assisted in making intelligent choices and to be aware of the choices they have.[22]

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[20] Twenty-seven advisory school board members (71 percent of those polled) requested the teaching of native culture, music, history, languages, arts and crafts. Coverdale, "Identification of School Board Training Needs," p. 60.

The possibility that educational technology may serve as the needed catalyst to break the mold of traditional lockstep teaching so prevalent in rural schools throughout Alaska, and indeed throughout the nation, is exciting to ponder. Numerous studies have confirmed the impression that small rural schools are the least innovative and more resistant to change than are other types of schools throughout the country.[23] Conceivably, as a result of the impact of advanced technology on rural Alaska, the artificial lines which divide children into grades can be abandoned, and true individualized instruction can result. The transmission of information, a task which takes an inordinate amount of the teacher's time, can be accomplished more effectively and efficiently by machines, and the teacher can be freed to concern himself with the task of instilling positive attitudes and developing self-direction and curiosity in children. The teacher's role may be altered drastically to allow him to become a coordinator of learning activities for which the student is primarily responsible rather than to serve as the source of all information and the one who identifies and directs all activities. With the teacher freed from his traditional role, he can devote his energies to the personalization of learning experiences which will allow each pupil to progress at a continuous, albeit individual, rate of growth.

Through technology, a variety of currently non-existent curricular resources can be made available to rural areas. Teachers and visitors to rural Alaska are shocked at the lack of relevant materials utilized in the schools. For example, in communities where drownings, careless use of firearms, and attacks by unleashed dogs cause deaths of children each year, it is not uncommon to find classroom instruction centered around health and safety texts which dwell on the function of traffic lights and which caution readers NOT to cross a street against the red light. In areas where there are NO streets!! Although the need for safety education is well recognized and is indeed a part of the school curriculum, too often classroom learning activities have little relationship to pressing problems in the community, largely because teachers are dependent on inappropriate and inadequate instructional materials.

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[21] Conversation with a Minto parent, October, 1971.

[22] Rider, " 'First Generation' and Competency-Based Teacher Training," p. 4.

[23] "Rural Education Program: Basic Program Plans" (Portland, Oregon: Northwest Regional Educational Laboratory, April, 1972), p. 1. (Mimeographed)

The child living in a rural, isolated Alaskan community has little contact, either direct or through media, with state, national, and world leaders whose actions may directly affect his future.[24] Typically, he cannot learn about President Nixon's recent visit to China except through written reports which arrive in his village several weeks after Nixon's return to Washington.

Through Telecommunications media, the student can hear and see world figures--philosophers, statesmen, scientists, artists--native and non-native. He can also learn about historical leaders. What better way to develop an understanding of the spirit and determination of the British people during World War II than tho hear the voice of Winston Churchill? Perhaps more importantly, he will have an opportunity to hear the voices of local and state leaders. He can learn about what measures the state legislature plans to enact in terms of land laws, pipeline rights, etc.

Without doubt, such utilization of outside resources would improve the currently deplorable holding power of rural schools. The United States Senate subcommittee on Indian education reported dropout rates as high as ninety percent in Nome's public schools, and also noted that about one-fourth of the students (notably Eskimo) required two to three years to complete the first grade.[25] It is obvious that when conditions leading to early departure from school are presented, pupil achievement suffers as well.

A study of the needs of rural Alaskan elementary school pupils cannot ignore the critical fact that a serious gap exists between rural and urban students. Therefore, permeating any program for rural areas should be the objective of minimizing the educational disadvantages of Alaskan native pupils. It is essential to provide enrichment in rural educational programs to assure opportunities at least equal to those in urban communities. And ideally, rural education programs must be among the best in the state if the current gap in educational opportunities is to be overcome.

A recent state program of testing illustrates the lag in achievement for children from ethnic minorities and from rural areas of Alaska.[26] For purposes of testing, Alaska's State Operated Schools were divided into three areas. Area 1 comprised 2,015 pupils from small rural communities with a predominantly native population. Area 2 consisted of schools where a cultural mix occurs or where there is a good balance among various ethnic groups. Area 3 schools included communities where the school district is predominantly middle-class Caucasian, with a very small percentage of native students enrolled.

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[24] Members of Alaska's Congressional delegation (Congressman Nick Begich, Senator Mike Gravel, and Senator Ted Stevens) have been diligent in their efforts to visit rural communities and to represent their rural constituents. And in 1969 Senator Edward Kennedy and other members of the United States Senate visited a number of rural communities to acquire first-hand information about the education of Alaska natives--probably the first time that national leaders had appeared in these communities.

[25] Indian Education: National Tragedy, p. 29.

[26] D.K. Thomas, Test Consultant, "Test Results for the Division of State-Operated Schools, March, 1971" (Alaska Department of Education, Division of State-Operated Schools, June 15, 1972).

The Iowa Tests of Basic Skills were administered. This test is divided into specific areas such as vocabulary, reading comprehension, language skills, work-study skills, and arithmetic skills, as shown in FIGURE 2-2. Table 2-5 illustrates the degree of retardation of pupils in Area 1 in comparison with national norms. It should also be noted that the disadvantage in achievement is cumulative as the student progresses from grade four to grade eight. Especially crucial, as previously indicated, are the language and reading deficiencies.

It should be noted that in verbal ability, fourth grade students in Area 1 are one year and four months below the national average, as measured by the Iowa Test. By grade eight, the disadvantage has increased to two years and two months. Also of vital importance is the fact that verbal abilities and reading comprehension are the areas of greater deficiency for students in Area 1. (See Table 2-5)

The danger of measuring members of minority groups with standardized tests is well recognized. Such instruments are culturally biased and possess a verbal emphasis which acts to the detriment of the child who belongs to an ethnic minority. It is essential to recognize the fact that children who test poorly are not necessarily less able or less intelligent in any way than are their more privileged peers. Nonetheless, we must also recognize that the deficiencies illustrated by standardized testing programs do affect the child's future success in a school setting.

An additional point should be made in conjunction with the lag in measured achievement of rural school children. Pupils are typically overage for their grades as well as behind the national norms when measured according to grade placement. Table 2-6 illustrates the percentage of students who are overage in rural schools (those operated by the Bureau of Indian Affairs and by the State of Alaska). It should be noted that more than fifty percent of the eighth grade students in both State and Bureau of Indian Affairs schools are overage. As with achievement deficiencies, the overage problem is cumulative and becomes more serious as the child progresses in school. With the known relation ship between dropping out of school and being overage in grade, the problem takes on even greater significance.

FIGURE 2-2

IOWA TESTS OF BASIC SKILLS IN ALASKA RURAL SCHOOLS

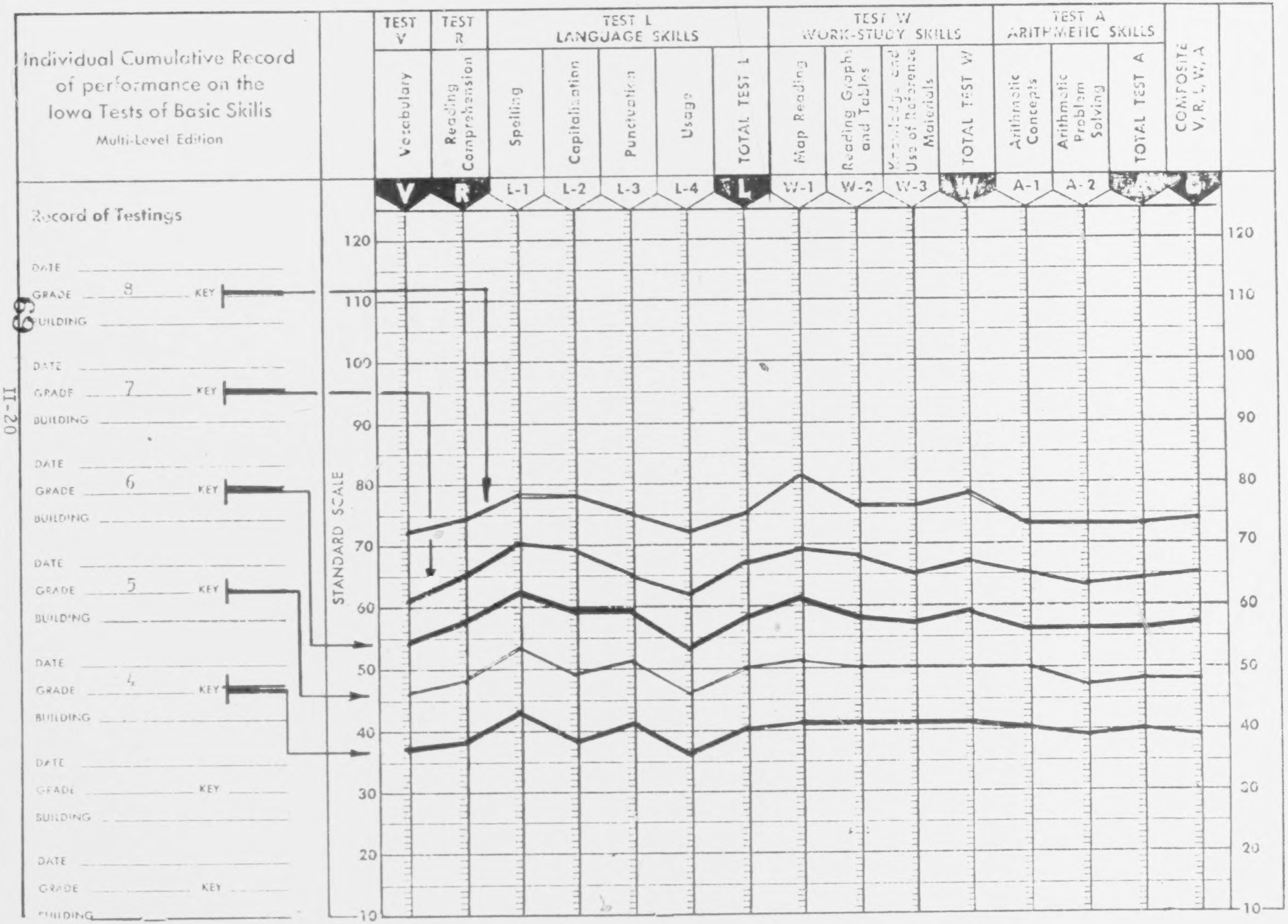

TABLE 2-5

A COMPARISON BETWEEN SCORES OF ALASKA STATE-OPERATED SCHOOLS
AND NATIONAL NORMS — MARCH 1971 TESTING

GRADE	V	R	L-1	L-2	L-3	L-4	L-T	W-1	W-2	W-3	W-T	A-1	A-2	A-T	C	Average
AREA 1																
4	1.4	1.3	.6	1.2	.9	1.4	1.0	.9	1.0	.9	.9	1.0	1.0	1.0	1.1	One year 4 months below national norm
5	1.7	1.4	.6	1.3	1.0	1.6	1.1	1.1	1.2	1.1	1.1	1.2	1.4	1.3	1.3	
6	1.8	1.5	.7	1.2	1.2	1.9	1.2	1.0	1.3	1.4	1.2	1.5	1.3	1.4	1.4	
7	2.1	1.7	.9	1.1	1.5	2.0	1.4	1.3	1.5	1.6	1.5	1.5	1.7	1.6	1.7	
8	2.2	2.0	1.0	1.5	1.6	1.9	1.5	1.3	1.6	1.7	1.5	1.8	1.9	1.9	1.8	
Area 1 has all minus scores																
AREA 2																
4	-.6	-.6	-.4	-.6	-.5	-.9	-.6	-.3	-.2	-.5	-.3	-.5	-.7	-.6	-.6	6 and 8/10 of one month below national norm
5	-.8	-.6	-.2	-.6	-.2	-.9	-.5	-.3	-.3	-.5	-.4	-.4	-.6	-.5	-.5	
6	-.9	-.8	-.3	-.4	-.7	-1.1	-.6	-.4	-.6	-.9	-.6	-.8	-.9	-.8	-.8	
7	-1.1	-.7	-.6	-.9	-.8	-1.3	-.9	-.4	-.5	-.9	-.6	-.9	-1.1	-1.0	-.8	
8	-.9	-.6	-.7	-.5	-.8	-1.0	-.7	+.1	-.5	-.5	-.3	-1.0	-.9	-1.0	-.7	
AREA 3																
4	+.1	+.3	+.1	+.1	+.3	+.1	+.2	+.2	+.3	0	+.2	0	-.2	-.1	+.1	8/10 of 1 month above national norm
5	+.1	+.3	-.1	+.4	+.2	0	+.1	+.4	+.2	+.3	+.3	+.1	-.6	-.3	+.1	
6	+.2	+.4	0	+.3	+.1	0	+.1	+.5	+.2	+.2	+.3	+.1	-.5	-.2	+.2	
7	+.2	+.3	-.2	+.3	-.2	-.2	-.1	+.4	+.4	0	+.3	-.1	-.6	-.3	+.1	
8	0	+.1	-.8	0	0	-.6	-.4	+.7	+.2	+.1	+.3	-.2	-.7	-.4	-.1	

This table shows the number of years and months that the average grade-equivalent scores for grades 4 through 8 in each of the three areas are below or above the national norm. A plus indicates so many months above the national norm and a minus indicates so many months below the national norm. A zero indicates a grade equivalent to the National norm.

TABLE 2-6

COMPARISON BETWEEN BIA AND STATE SCHOOLS BY PERCENTAGE OF OVERAGE PUPILS
1967 - 1968

Grade	Total Enrollment by Grade		No. Overage		Percent Overage	
	BIA	State	BIA	State	BIA	State
Beg.	671	236	141	8	21.0	.033
First	725	844	188	212	25.9	25.1
Second	722	659	239	270	33.1	40.6
Third	660	608	292	250	44.2	41.7
Fourth	593	576	293	242	49.4	42.8
Fifth	621	568	325	270	52.3	47.3
Sixth	569	463	341	175	59.9	37.3
Seventh	507	503	270	257	53.3	51.4
Eighth	453	546	259	279	57.2	51.5
Totals	5,521	5,003	2,348	1,963	42.5	39.2
Ungraded Grades 1-8	367					
Total	5,888					

Source: Pupil enrollment files of the BIA (Juneau) and State Department of Education (Anchorage)

Native leaders have mandated that their children must be able to compete successfully in the larger American society and should be prepared to continue their education to the collegiate level or post-high school vocational level. The American public at large, through legislative and executive representatives, have also demanded equal educational opportunities for all Americans. Therefore, we must be committed to provide equal access to educational opportunities for all Alaskan citizens.

2.2.3 Secondary Education

Possibly the most emotionally laden problem in Alaskan education concerns alternative plans for providing secondary educational opportunities for rural youth. Table 2-7 shows that approximately seventy percent of Alaska's native population resides in communities with fewer than five hundred residents.[27] With no network of roads or railways connecting these small communities, the usual solution of providing consolidated high schools for students who travel each day from their home communities to a central location is impossible in Alaska.

TABLE 2-7 - DISTRIBUTION OF ALASKA NATIVES BY SIZE OF PLACE IN PREDOMINANTLY NATIVE PLACES, 1967

			Cumulative Totals	
Total Size of Place	No. of Places	Native Population	No. of Places	Native Population
25-99	50	2,839	50	2,839
100-199	64	8,813	114	11,652
200-299	26	5,735	140	17,387
300-399	15	4,357	155	21,744
400-499	12	4,807	167	26,551
500-599	2	1,021	169	27,572
600-699	2	1,113	171	28,685
700-799	-	-	171	28,685
800-899	1	825	172	29,510
900-999	-	-	172	29,510
1000-2499	6	7,888	178	37,398

Source: Villages in Alaska and Other Places Having a Native Population of 25 or more, a report prepared by the Federal Field Committee for Development Planning in Alaska, Anchorage, Alaska, 1967.

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[27] Federal Field Committee for Development Planning in Alaska, Alaska Natives and the Land (Washington: Government Printing Office, October, 1968), p. 6.

Traditionally, the Bureau of Indian Affairs adopted the policy of requiring those children who chose to enroll in high school to leave their communities in order to attend boarding high schools in Alaska or Bureau of Indian Affairs schools out of the state. Until approximately seven years ago, the State of Alaska attempted to provide minimum high school programs in those rural communities in which it was primarily responsible for the educational program either by establishing schools where enrollment warranted it or by providing correspondence study.

During the past decade a shift in the conceptual positions of both the Bureau of Indian Affairs and the State of Alaska has resulted in the State establishing dormitories in areas where schools exist and the Bureau of Indian Affairs providing an extended program in some of their elementary schools to include secondary grades.

Nonetheless, at the present time approximately five hundred native students attend government boarding schools in states other than Alaska.[28] An additional seventeen hundred pupils are enrolled in high schools located in localities other than their home communities.[29]

The deleterious effects of encouraging pupils of high school age to leave their families and home communities in order to continue their education are well established. On the other hand, the prohibitive expense of providing adequate secondary schools in extremely small villages is even easier to document. However, native leaders, while recognizing both the advantages and disadvantages of the small high school, prefer that rural students be educated in their home communities.[30]

Recent testimony of advisory school board members in hearings before the Alaska State Board of Education supports the concept of providing education in local communities, wherever possible, for rural youth. It should be noted, that regional differences on this issue exist within the state. Indian leaders from Southeastern Alaska tend to view the schools as vehicles for social mobility and stress the importance of educating young people in such a manner as to equip them to compete successfully with members of the dominant society.

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[28] Information provided by William Long, Education Program Administrator, Bureau of Indian Affairs, Fairbanks Area Office, February 9, 1972.

[29] Information provided by James M. Harper, Director, Division of Regional Schools and Boarding Home Program, Alaska Department of Education, March 16, 1972.

[30] Eighty-nine percent of advisory school board members who were interviewed favored educating children in secondary schools in their home communities. Coverdale, Identification of School Board Training Needs, pp. 57-59.

Conversely in northern Alaska greater emphasis is placed on preventing disruption of a child's life by removing him from his home.[31] However, the overall commitment in the state is toward providing secondary educational opportunities for children in or near their home communities.

Secondary educational needs have been assessed in various ways. Pupils have been polled to ascertain which features of their secondary school education were of value and which aspects were especially unpalatable. Similarly, studies have been conducted of rural high school dropouts who were asked why they left school and of secondary school persisters who were queried as to what caused them to remain in a formal education program. Parents and community leaders have been questioned about what they believed to be the needs of secondary school pupils.

There is general agreement on the part of professional staff, students, and rural citizens as to the importance of the following categories of needs of secondary school students.

2.2.3.1 Competency in basic academic subjects

Complete agreement exists that the rural student must be able to "survive in Alaska's two cultural streams."[32] And to do so, he must be fundamentally knowledgeable in the academic subject areas typically taught in secondary schools. As indicated in the sections concerned with early childhood and elementary education, the development of communications skills is crucial.

Despite the fact that most native children and adults speak English in varying degrees, the discrepancy between the level of language spoken and that required in school is marked. And the necessity for well-developed English skills as a prerequisite for pursuing other subject areas is well established. While speaking and writing skills have top priority in the academic subjects demanded by pupils and their parents, mathematics, social studies, and science also rank high in importance.[33]

2.2.3.2. Preparation for gainful employment

The necessity for career education is emphasized in all needs assessments and inevitably emerges in virtually all conversations with rural residents when the topic of education is broached. Ethnic minorities, as well members of the white middle-class society see education as the vehicle for upward mobility in status as well as for increased employment opportunities. However, unrealistic expectations have often led to disillusionment concerning the value of education. In the early 1960's, Ray found that parents who had encouraged their children to leave home for high school were distressed when they returned unprepared for employment and unable to assume work responsibilities in the community. One father was especially irate when his high-school-aged son returned from Mt. Edgecumbe Boarding School unable to even repair a "kicker," and he wondered what in the world the lad had been learning in school all winter.[34]

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[31] "Minutes of the Alaska State Board of Education, Fourteenth Regular Session" Anchorage, Alaska, February 25-26, 1971, (Juneau, Alaska: Alaska Department of Education), pp. 2-4. (Mimeographed)

[32] Nome-Beltz Needs Assessment (Juneau, Alaska: Alaska Department of Education, March, 1970), p. 32.

[33] Ibid., p. 33.

The type of employment for which educational preparation is desired relates directly to the pupils' home region. In the Seward area, for example, the range of work opportunities is relatively limited. Table 2-8, illustrating a survey of high school students in the Nome area, lists types of work toward which most pupils aspire.[35] The fact that most students looked upon work that does not require college graduation as desirable is especially significant and has direct implications for secondary education.

As expected, the job market in Southeastern Alaska places greater emphasis on skills relating to the fishing and timber industries. And in remote regions of the Arctic, where people have been in contact with military installations and DEW line sites (Distant Early Warning), great importance is given to the need for training in electronics and communications (radio repair, etc.)

Not only is career education which will provide information about job requirements and opportunities essential, but also the demand exists for actual work experiences on the part of the students. Many hold unrealistic perceptions of competencies needed in various occupations, which suggests emphatically the need to actually experience and explore various types of careers. And in light of the very limited number of occupations which can be viewed first hand by the village youth, information as to the range of employment which may become available in future years is equally essential.

2.2.3.3. Enhancement of personal confidence and self-concept.

While the need to develop a healthy self-concept is persistent and one that should be emphasized at all educational levels, the problem is perhaps most acute at the secondary school level. Adolescence is traditionally a trying time during which young people attempt to develop a personal identity and independence from adults who have dominated their lives previously. The rural Alaskan

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[34] Ray, et al. Alaskan Native Secondary School Dropouts, p. 298.

[35] Nome-Beltz Needs Assessment, p. 29.

TABLE 2-8

TYPES OF WORK TOWARD WHICH MOST STUDENTS ASPIRE IN NOME AND BELTZ AREAS

NOME								BELTZ			
Native				White				Native			
Males		Females		Males		Females		Males		Females	
n = 61		n = 56		n = 21		n = 26		n = 72		n = 67	
10	Aviation	18	Secretarial	25	Bus. Mgmt.	6	Stewardess	13	Electronics	27	Secretarial
9	Mechanic	8	Stewardess	2	Teacher	6	Clerk	12	Mechanic	23	Nursing
5	Electronics	8	Nursing	2	Mechanic	5	Teacher	12	Carpentry	13	Dentistry
4	Construction	7	Teacher	2	Service	2	Design	5	Welder	7	Teacher
3	Bus. Mgmt.	2	Accountant	2	Aviation	2	Waitress	4	Aviation	3	Stewardess
3	Broker	2	Soc. Worker	2	Musician	1	Mechanic	4	Construction	3	Clerk
3	Architect	2	Doctor	1	Design	1	Musician	3	Teacher	2	Soc. Worker
3	Clerk	2	Waitress	1	Welder	1	Doctor	3	Engineering	1	Bus. Mgmt.
2	Teacher	1	Design	1	Engineering	1	Beautician	3	Equip. Oper.	1	Service
2	Accountant	1	Bus. Mgmt.	1	Doctor			2	Bus. Mgmt.	1	Waitress
2	Equip. Oper.	1	Engineering	1	Construction			2	Service	1	Librarian
2	Musician	1	Service	1	Dentistry			2	Architect		
2	Policeman	1	Clerk	1	Veterinary			2	Policeman		
1	Service	1	Psychiatrist	1	Artist			2	Weather		
1	Secretarial	1	Scientist	1	Farmer			1	Astronaut		
1	Doctor	1	Beautician	1	Geology			1	Clerk		
1	Carpentry	1	Photography					1	Doctor		
1	Dentistry							1	Surveyor		
1	Veterinary							1	Railroad		
								1	Lawyer		
								1	Computers		

youth who is a member of an ethnic minority group faces especially difficult problems. That he is often not successful with coping with these problems will be documented in more detail when health needs are considered. But a relationship clearly exists between self-confidence and success. It is equally well established that the typical Indian and Eskimo child during his high school years does not view himself with much confidence. In recent remarks made before the State Board of Education, Charles Lafferty stated:

> The feeling of inferiority held by many native youth by the time they reach adolescence may stem from several sources: A lack of understanding of his heritage, from poverty, or from the attitude of the members of the dominant culture. In the last half century at least, the attitude of those in the majority culture has not been antagonistic or rejective. It has often been friendly in a patronizing manner; or, more frequently, there has really been no attitude at all. For the majority of Americans, the Indian as a member of the modern social order was one they did not think much about one way or the other. The "white" man has not understood the Indian and rather than looking at him has looked past him or through him. For many, it has been as though the Indian did not exist.[36]

A recent study by Norma Forbes examined in detail the relationship between self-image and the intellectual functioning of minority group children. She found measurable and direct correlations between self-confidence and performance.[37]

A College Orientation Program for Alaskan Natives directed by Lee Salisbury involved secondary school pupils who planned to attend college. One of the major objectives of the program was to improve the student's perception of himself and his abilities. During the duration of the program, students wrote essays about themselves, their home communities, their fears, and goals to which they aspired. A multitude of poignant statements were penned which illustrated the feelings of hopelessness which characterize the lives of many rural youth.

One adolescent girl writes about her experiences in jail and compared them not unfavorably with her home life as follows:

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[36] Charles W. Lafferty, "Education of the Alaskan Native," (Summary Remarks before the State Board of Education in Juneau, February 4 and 5, 1972), p. 4. (Mimeographed)

[37] Norma Forbes, "Effects of Attitude and Intelligence Variables upon the English Language Achievement of Alaskan Eskimo children," (Unpublished master's thesis, San Jose State College, San Jose, California, 1972), p. 52. (Typed)

> "Jail was certainly better than the conditions at the place that was supposed to be my 'home'. To me it was a place that was sometimes warm and had the smell of fresh baked bread. Those times were far and few between. The rest of the time it was cold. My sisters and brothers would be trying or unsuccessfully trying to occupy themselves when I came home from school. There would be all kinds of beer bottles all over the house. My parents would be out cold on the floor or not there at all. Sometimes, my dad would be beating up my mom. There would be blood all over the furniture. My mom would be begging him to stop. When I was much younger, I used to crawl under the bed and cry. But as I grew older, I had others to think about, so I would take my brothers and sisters for a walk—trying to calm them."[38]

2.2.3.4 Development of Independent Thought

The need for rural youngsters to develop the ability to view alternatives and options available to them and make intelligent choices is persistent and is a clear mandate to the schools. This objective in part encompasses the needs previously listed in this section, but its importance suggests a separate listing. The typical rural adolescent does not have an adult model to emulate, since he is faced with decisions as to his life's work and life style which are different from those problems faced by his elders.

Additionally, rural Alaskans are demanding a greater voice in determining their own future than has traditionally been afforded them. In anticipation of a new role for today's youth, the need exists for preparation of leaders who can act independently and intelligently. For only through the emergence of indigenous leadership can the patronizing control of the dominant society be loosened.

2.2.4 Higher Education

Higher education needs in Alaska are not being met by conventional means. Community colleges exist in areas large enough to provide minimum enrollments, if qualified instructors can be located and if classroom facilities are available. At the present time, such colleges are operated in Anchorage, Juneau-Douglas, Kenai, Ketchikan, Kodiak, Matanuska-Susitna, and Sitka. One has only to glance at the map to realize that the more isolated areas of the state are not being served. Consequently, experiments such as a "video-university" which has been proposed at a recent meeting of the American Council on Education[39] and information about England's Open University, are of more than casual interest to those concerned with higher education in the state.

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[38] Lee H. Salisbury, "College Orientation Program for Alaska Natives: COPAN-66, A Final Report", College, Alaska: University of Alaska, January 15, 1967, p. 8. (Mimeographed.)

[39] "Radical Changes Confront Higher Education" Education, USA, October 18, 1971, p. 37.

The lack of facilities is but one of a number of factors which have prevented rural Alaskans from attaining advanced education. Indeed, the history of higher education for those citizens who live in rural communities has been discouraging.

Most native students who attend college enroll in institutions of higher learning in the state of Alaska. According to projections of student enrollment for the 1972-73 school year, 300 native students will enroll at the University of Alaska in Fairbanks; 150 students will probably register at the University of Alaska in Anchorage; 150 students may enroll at Alaska Methodist University; and another 100 will affiliate with Sheldon Jackson Junior College at Sitka.[40] By contrast, twenty-eight native students were enrolled at the University of Alaska in 1957[41], prior to the existence of Alaska Methodist University and before the establishment of daytime courses at the University of Alaska in Anchorage.

Rural students enrolling in institutions of higher education have experienced a significantly higher attrition rate than have urban students. Until 1961, when seven native students obtained the baccalaureate degree, the number of native graduates from the University of Alaska was insignificant.[42]

Because of the difficulty in following a student;s activities after he leaves the university campus, it is not possible to determine whether he re-enrolled in college elsewhere or terminated his education. However, raw data which reflects the enrollments and dropout rate on the Fairbanks campus (and do not include those who re-entered school elsewhere) are as follows:[43]

Fall of 1968	Enrollment	Dropout	Percentage
Two-year program	52	17	33
Four-year program	23	8	35
Interim	43	21	49
	118	46	39

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[40] Conversation with Robert Egan, Head of the Student Orientation Services Program, University of Alaska, May 1, 1972. (The Student Orientation Services Program is designed to provide special assistance to rural Alaskans.)

[41] "Progress Report for Student Orientation Services Program", Presented to the University of Alaska Academic Council, December 9, 1971, p. 2. (Mimeographed)

[42] Ibid.

[43] Ibid., pp. 12-13.

Fall of 1969	Enrollment	Dropout	Percentage
Two-Year program	34	14	41
Four-year program	24	9	38
Interim	33	6	18
Unknown majors	4	3	7
	95	32	33.6
Fall of 1970			
Freshman	169	39	23
Sophomore	31	1	3
Junior	18	1	5
Senior	16	2	13
Graduate	2	0	0
	236	43	18.3
Two-year program	65	22	34
Four-year program	103	10	10
* INRM and without	66	11	17
Graduate	2	0	0
	236	43	18.3
Spring of 1971			
Freshman	152	19	12.5
Sophomore	31	1	3.2
Junior	17	0	0
Senior	14	1	7.1
Graduate	2	0	0
	216	21	9.7
Two-year program	43	7	16.2
Four-year program	103	14	13.4
INRM and without	67	0	0
Graduates	2	0	0
	216	21	9.7
Fall of 1971 (as of December 1)			
Two-year program	72	17	5.6
Four-year program	105	10	3.1
INRM and without	134	16	5.0
Graduate students	3	0	0
	314	44	14.0

* One who has not declared a major field of study and without class standing

Reasons for lack of student success are varied. The cultural shock which has already been referred to is serious for students making the transition from a small, rural school to an institution of higher education. Suicide attempts are not unheard of, and less drastic evidence of student insecurity and fear are apparent.

The academic preparation is typically inadequate for the student who has attended a small, isolated high school or a boarding school where little academic achievement is expected. As well as entering college with inadequate preparation, such a student has often been conditioned to function at a level far below his potential. In testimony before the United States Senate Subcommittee on Indian Education, Alaska Senator Willie Hensley stated, "I believe that the learning abilities of the Native population have been seriously underestimated, particularly by the Bureau of Indian Affairs in the past. Many students who are college material are in trade schools. The native student, because of the cloistered life in isolated BIA dormitory schools often does not fully understand his true capabilities until he has finished high school and finds someone with the right attitude who encourages him."[44]

2.2.5 Professional Training of Teachers and Other Rural Workers

A special category of rural Alaskans in need of education are those employed either in a professional or technical capacity, who should have in-service training. Of professional personnel working in rural Alaska, most are employed in education and health-related occupations. During the 1971-72 school year, for example, 483 teachers and 34 teacher aides are employed by the State-Operated Schools.[45] Most professional personnel were not trained in Alaska and are in need of information pertinent to the situation in which they are currently employed. Differences in learning styles of pupils, absence of experienced professional personnel with whom to consult, and lack of information relevant to their situations are among the obvious problems these rural workers encounter.

Until recently, turnover among rural teachers has averaged as high as thirty-three percent, although the current shortage of positions has caused this rate to decrease. Nonetheless, many teachers new to Alaska are employed each year and are totally frustrated by the problems they face. In-service education which will diminish cultural shock and provide practical, down-to-earth suggestions for teaching children in a cross-cultural setting is essential.

Too often cultural understanding is thought of as something needed only by Alaskan natives. However, the term "cross-cultural" education implies education of both natives and non-natives which will improve their understanding of each other and lessen the sometimes evident intolerance and prejudice. Currently there is a strong interest in information about the cultural values of minority groups, but materials are either non-existent or are inappropriate. Much of the anthropological data is written in technical terms and is not comprehensible to the typical adult without background in the behavioral sciences. The production of relevant materials which will contribute to cross-cultural understanding by citizens, both urban and rural, is essential.

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[44] Hearings on Indian Education, p. 454.

[45] Information provided by Elaine Nelson, Statistical and Public Law 874 Attendance Coordinator, State-operated School System, Anchorage, Alaska, February 17, 1972.

Teachers and other educational personnel will be primarily responsible for the utilization of educational media. Therefore, professional training in the proper use of new educational technology undergirds the success of any program of telecommunications. Typically, when one is unfamiliar with or insecure in an area of expertise, he avoids it. Undoubtedly, the classroom teacher is the key to success of a rural communications network which will be used for education. Careful instruction to give him confidence in the utilization of this vital means of enriching the education of rural adults and children must be provided.

A current experimental program combining a Career Opportunities Program and a Teacher Corps project is designed to train indigenous personnel for teaching positions in rural schools. Aides and interns in eleven native villages obtain educational training in the communities in which they reside through a variety of means, including video-taped lessons. However, since the inception of the program in 1970, a major obstacle has been adequate communication. Delays in mail have caused lessons to arrive out of sequence and in some instances more than six weeks late. Consequently, in the most recent proposal for continuation of the program, a demand for "more sophisticated communications technology through which information and knowledge can be exchanged between the academic and urban centers and the rural communities" was made.[46]

2.2.6 Adult Education

"The colleges are doing little more than scratching the surface with respect to the need for adult and continuing education in the state", according to Alan Thomas, a consultant to the Advisory Council on State Financial Support to Public Schools.[47] Credence to this statement is evidenced by the fact that of the non-white Alaskans who were twenty-five years of age or older in 1970, 41.1 percent had completed fewer than eight grades in school.[48] Furthermore, low educational level of attainment is primarily a rural problem. The 1970 census report indicates that seventy-five percent of Alaska's white population, twenty-five years of age and older, has completed the twelfth grade, whereas only twenty-seven percent of non-whites have progressed through high school.[49]

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[46] Alaska Rural Teacher Training Corps, "Proposal for 7th Cycle Project, 1972", (Alaska State-Operated Schools, Alaska Rural Teacher Training Corps, Anchorage, Alaska, November 19, 1971), p. 18. (Mimeographed).

[47] Directions 70's, p. 55. The University of Alaska's Cooperative Extension Service does provide services to rural as well as urban regions of the state, although it cannot meet the overall demands with its limited resources. However, during 1970, over 1/2 million bulletins, dealing primarily with agriculture, homemaking skills, youth programs, were distributed by district and state offices. Alaskan Outreach '71 (College, Alaska, p. 2)

In an extensive adult education needs assessment conducted in 1969, Laurel Bland indicates that the "statistical data provide ample evidence to conclude that the needs for Adult Basic Education in Alaska are concentrated almost exclusively within the Alaskan Native population."[50] She also noted the absence of coordinated planning efforts which would be needed to approach the complex problem in anything resembling an adequate manner.[51]

Regional differences in the number of school grades completed by rural Alaskan adults are striking. Extreme variations in educational level of rural adults twenty-five years of age and older exist. Variations range from a median of 4.0 years of school completed in Nethel to 9.9 years completed in Angoon.[52]

Implications of the low level of education possessed by the majority of rural Alaskans are clear. The uneducated are typically unemployable in a highly technological society. Such is clearly the case in Alaska. The median income for non-white Alaskans in 1970 was $3,282.00 as compared with the median income during the same year for whites of $8,166.00.[53]

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[48] United States Bureau of the Census, 1970 Census of Population: General Social and Economic Characteristics—Alaska, PC(1)C3 (Washington: Government Printing Office, November, 1971), p. (3)-88. Hereinafter referred to as U.S. Census, Social and Economic Characteristics: Alaska.

[49] Ibid.

[50] Laurel L Bland, "Adult Basic Education Needs Assessment for the State of Alaska", (College, Alaska: University of Alaska, May, 1969), p. 2. (Mimeographed.) Bland determined that over 25,000 rural Alaskans are in need of adult basic education by eliminating those numbers of the population who are in school, over sixty-five or under five years of age, etc. The broad regional distribution of this population is shown on the map in FIGURE 2-3, Ibid., p. 31.

[51] Ibid., p. 2

[52] U.S. Census, Social and Economic Characteristics: Alaska, p. (3)-155.

[53] Ibid., p. (3)-89.

MEMORANDUM

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF EDUCATION

TO : Mr. Frank Bryars
Program Officer, ERIC

DATE: August 1, 1972

FROM : Adolph Koenig
Acting Deputy Director, DTD

SUBJECT: Dissemination of Alaska Telecommunications Study Final Report Through EDRS.

The attached final report for contract number OE-0-72-0686 has been accepted and contract closing procedures have been initiated. As part of these procedures, NCET wishes the report to be made available through the ERIC system. Because of the anticipated demand for copies of the report by both concerned Alaskans, Federal Agencies, and interested commercial and industrial organizations we hope that the document can be made available for public purchase as soon as possible.

83A

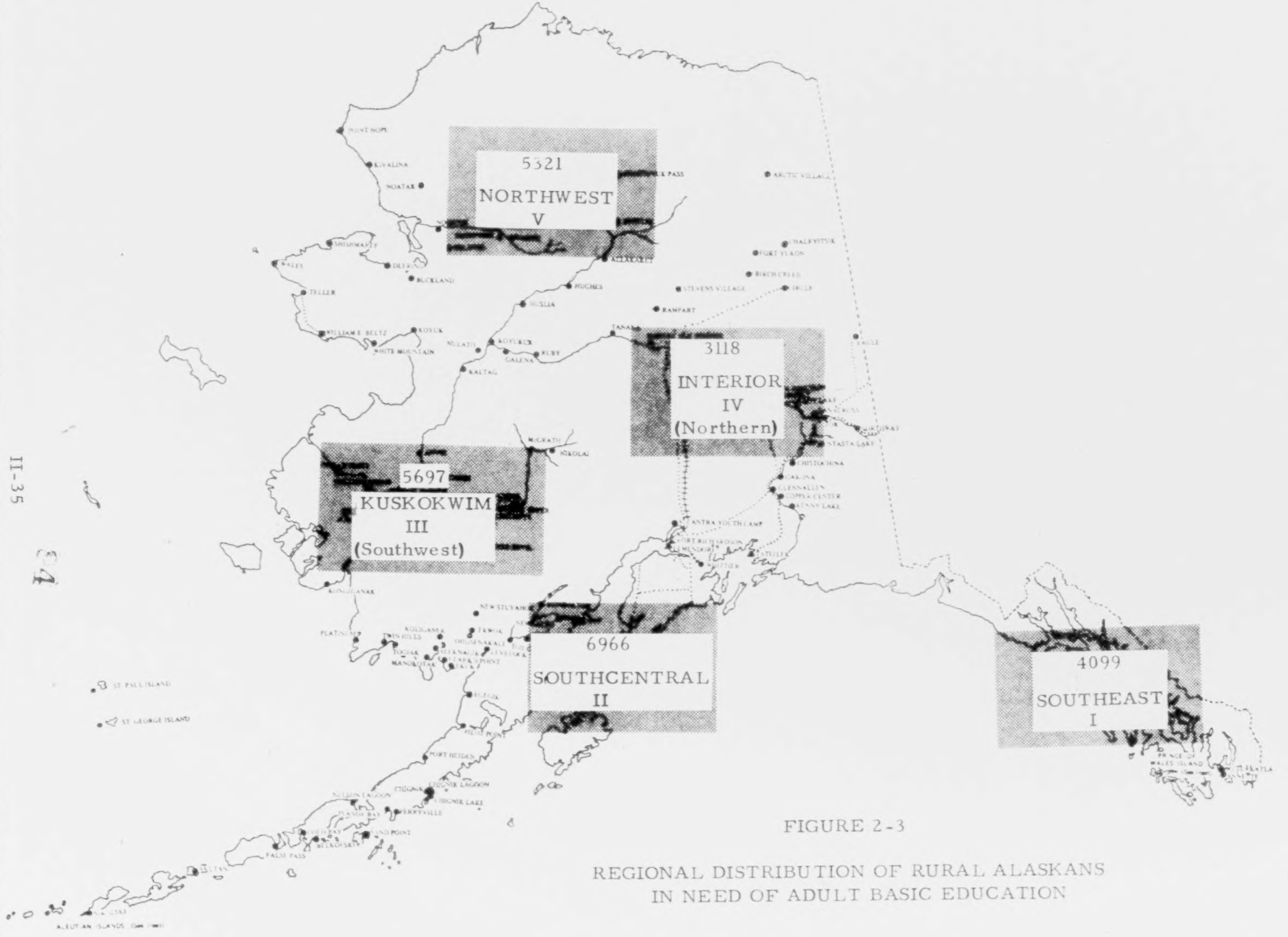
5321
NORTHWEST
V
3118
INTERIOR
IV
(Northern)
5697
KUSKOKWIM
III
(Southwest)
6966
SOUTHCENTRAL
II
4099
SOUTHEAST
I
POINT HOPE
KIVALINA
NOATAK
SHISHMAREF
WALES
TELLER
DEERING
BUCKLAND
KOYUK
WHITE MOUNTAIN
HUGHES
HUSLIA
KOYUKUK
NULATO
GALENA
RUBY
KALTAG
TANANA
RAMPART
STEVENS VILLAGE
BIRCH CREEK
FORT YUKON
CHALKYITSIK
ARCTIC VILLAGE
EAGLE
MCGRATH
NIKOLAI
CHISTOCHINA
GAKONA
GLENNALLEN
COPPER CENTER
KENNY LAKE
FORT RICHARDSON
WHITTIER
NEW STUYAHOK
EKWOK
KOLIGANEK
TWIN HILLS
TOGIAK
MANOKOTAK
PLATINUM
KWIGILLINGOK
PILOT POINT
PORT HEIDEN
CHIGNIK LAGOON
CHIGNIK LAKE
PERRYVILLE
NELSON LAGOON
FALSE PASS
BELKOFSKI
ST PAUL ISLAND
ST GEORGE ISLAND
ALEUTIAN ISLANDS
PRINCE OF WALES ISLAND

FIGURE 2-3

REGIONAL DISTRIBUTION OF RURAL ALASKANS
IN NEED OF ADULT BASIC EDUCATION

Ample evidence exists that the traditional subsistence living experienced by rural Alaskans for centuries will no longer suffice. Further elaboration is unnecessary.

2.2.6.1 Employment

Therefore, first in priority among needs of rural Alaska adults is education which will help to prepare them for gainful employment. Such education must include basic skills in communication, reading, arithmetic, and practical knowledge such as that required to report income taxes, to order goods and supplies from mail-order firms, to complete application forms for employment or for public assistance, etc. Furthermore, rural Alaskans require specific education and training for jobs that are available or potentially available in their regions of residence. Perhaps even more important, in view of limited job opportunities available in their home communities, rural Alaskans should be apprised of available or potential jobs in other areas of the state. And preparation which will enable them to move to localities geographically distant and culturally different from their home environment must be forthcoming.

2.2.6.2. Health and Sanitation

A second educational priority lies in the area of health and sanitation. Despite recent improvements in this area, the infant mortality rate for Alaska natives is more than twice the rate for white Alaskans.[54] Regional differences are apparent. The numbers of post natal deaths and the rate of infant mortality are greatest in the Kuskokwin and Lower Yukon River areas with 66/1000 deaths.[55] Illness and disease cannot be separated from factors related to poverty (low income, poor diet, lack of sanitation facilities). However, ignorance as to how disease is spread certainly contributes to this high death rate. Information as to how certain illnesses can be prevented is essential. While those affected by such illnesses are not exclusively adults, the major influence required to minimize sickness and malnutrition must come from the adult community.

Perhaps the most serious health problem experienced by native children is otitis media. An estimated ten to fifteen percent of the native population suffers from chronic ear infections. Data collected in twenty-seven villages in the Bethel area shows that forty percent of infants one year of age and under suffered from acute otitis media with purulent otorrhea.[56] Hearing loss was found to be in direct proportion to the number of episodes of otorrhea. Parents frequently do not report draining ears because they do not realize that this condition is unusual. The effect of hearing loss on academic success is apparent.

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[54] J. Kenneth Fleshman, "Health of Alaska Natives," Alaska Medicine, (March, 1968) 40.

[55] Ibid.

[56] Ibid.

At a recent meeting of the Alaska Educational Broadcast Commission, John Devons, an audiologist, indicated that Alaska's inordinately high incidence of hearing loss is frustrating to professional personnel working in this area because many cases are preventable through appropriate education. For example, the exposure of rural youngsters to dangerously high, protracted noise levels caused by snow machines is a current problem. Simple ear plugs could prevent damage if the danger were understood by parents and children.[57] Leading causes of hospitalization among Alaska natives are, in order of incidence, bronchopneumonia, fractures, otitis media, gastroenteritis and colitis, pulmonary tuberculosis, lacerations, hypertrophy of tonsils and adenoids, lobar pneumonia, and acute brain syndrome associated with intoxication.[58] And while venereal disease is not listed as a major cause for hospitalization, it is an extremely serious problem in Alaska. A recent article in Newsweek indicated that Alaska has the highest rate of venereal diseases in the nation. The number of reported cases of gonorrhea were 913.7 per one hundred thousand of population. South Carolina, the state with the next highest incidence, had 513.2 cases per one hundred thousand of population, only a little more than one-half the rate reported in Alaska.[59] To compound the problem further, it is a well-recognized fact that only a small percentage of known cases of venereal diseases is actually reported. A prominent Fairbanks physician stated confidentially that in his clinic possibly fewer than one-fourth of the cases treated were documented because of the time-consuming paperwork required to make official reports concerning the treatment of these diseases.[60]

A problem similar to that of quantifying the incidence of venereal disease is the difficulty of measuring accurately the extent of damage caused by intemperate use of alcohol in Alaska. As noted above, acute brain syndrome associated with intoxication is one of the ten leading causes of hospitalization in the state. However, no accurate records exist to show the relationship between alcohol and two other leading causes of hospitalization--fractures and lacerations, although a causal relationship is evident. Alcoholism is analogous to venereal disease in that it does not result in extensive hospitalization. However, it causes untold agony to those individuals suffering from the disease as well as to their families and friends. Alaska shares with California and Washington D. C., the distinction of being one of the three or four areas in the nation with the highest incidence of alcoholism. But unlike California and Washington, D. C., where evidence of the disease is visible, alcoholism in rural Alaska is largely unreported, untreated, and even unnoticed by most members of the dominant society.

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[57] John Devons, "Report to the Alaska Educational Broadcast Commission," Anchorage, Alaska, March 10, 1972.

[58] Alaska Natives and the Land, p. 22.

[59] Although the number of reported cases of syphilis in Alaska is 8.5 per one hundred thousand of population, approximately one-fourth the number reported in Georgia, the state with the highest incidence (32.4 per one hundred thousand), the total reported cases of venereal diseases in Alaska exceed those tabulated for other states.

[60] Conversation with Fairbanks physician, January 5, 1972.

Although when the disease has been diagnosed on an individual basis, alcoholism must be treated, more promising from a long-range point of view is the development of preventative programs. As Dr. Joseph Bloom indicated, "One must look at the mounting evidence which relates destructive drinking to the very structure and processes of society such as social class, opportunity structures, minority group status, racial attitudes."[61] Therefore, an effective approach to coping with the problem must be far broader than can be dealt with through curative medical methods. That programs of prevention are inadequate is evidenced in the report to the United States Senate Subcommittee on Indian Education by Alaska's chief psychiatrist for the United States Public Health Service, indicating that the number of alcoholics among the native population has doubled in recent years.[62]

Much has been spoken and written about the stresses and pressures of adapting to a new life style as contributing to the mental health problems of Alaskan natives. Regardless of the causes, evidence of the gravity of the problem is striking. The low self- concept of native youth has been referred to, But the extent to which mental health problems are converted into acts of self-destruction is generally not known. At a recent conference on suicide and self-destructive behavior held in Nome, Dr. Robert Kraus, a psychiatrist, reported that the suicide rate among white Alaskans is twice that of the lower states. However, the suicide rate among Alaskan natives is FOUR TIMES that of whites in the lower states and has been rising since 1965.[63] At the same conference, Dr. Karl Koutsky, superintendent of the Alaska Psychiatric Institute, stated that in the forty-year-old alcoholic was the "prime bet for a suicide attempt". Now, according to Koutsky, the most dangerous age for suicides among the natives is from fifteen to twenty-five years of age.[64]

Rural Alaskans also die or are disabled as a result of preventable accidents. While the traditional hunting and fishing activities are hazardous, many injuries and deaths are needless. Careless use of firearms, mushroom poisoning, and fires are but examples of the types of accidents which are for the most part preventable through education, including first-aid techniques, treatment of freezing or frostbite, water safety, snowmobile safety, etc.

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[61] Joseph D. Bloom, "Socio-Cultural Aspects of Alcoholism", Alaska Medicine, XII (September, 1970), 65

[62] Indian Education: National Tragedy, p. 17.

[63] News item in Fairbanks Daily News-Miner, November 22, 1971, p. 17.

[64] Ibid.

Dietary deficiencies are common among rural children, partly because of the poverty of their parents and partially because of insuficient information as to how to make the best use of family resources to provide balanced meals and adequate dietary supplements. Consumer education designed to provide rural residents with information about how to utilize their limited resources wisely is vital.

Education designed to help prevent the spread of communicable diseases is especially necessary in Alaska where sanitary sewage facilities are lacking, water supplies are frequently contaminated, and crowded living conditions are the rule rather than the exception. While correction of such conditions is a long-range goal worth seeking, information which will minimize the spread of diseases is essential at present.

2.2.6.3 Recreation and Leisure Time

Recreation and aid in constructive use of leisure time are also essential for adult Alaskans. Children in school usually have daily activities and recreational opportunities which, although not adequate, are minimally satisfactory. On the other hand, adults are often employed only seasonally, if at all, and have countless hours to fill. Absence of enjoyable leisure-time activities undoubtedly accounts in part for excessive drinking and general discontent so readily observable in rural communities.

While the need for adult education is apparent, it is encouraging to note that parents in the Seward Peninsula area who were asked if they would avail themselves of classes, if offered, responded overwhelmingly that they would.[65] Although verbal statements of interest cannot be translated into enrollments, they do provide indications of concern. Table 2-8 may also serve to indicate the kinds of classes desired by parents as well.

2.3 REGIONAL DIFFERENCES IN EDUCATIONAL NEEDS AND LEARNING STYLES

Frequent reference has been made throughout the report to regional differences and distinctions which exist within Alaska and between Alaska and other states. And indeed such differences are apparent. Yet, some of the differences occur in degree rather than in kind. For example, all individuals, children and adults, rural and urban, have the need to improve communication skills whether they live in Savoonga or Boston. But the degree of severity of the English language handicap varies tremendously from regions where children enter school with no knowledge of English to more acculturated communities in Southeastern Alaska where no one under fifty years of age has knowledge of his native tongue. And even where English is spoken exclusively in the community, it is often a pidgin English or language quite foreign to that utilized in the classroom.

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[65] Nome-Beltz Needs Assessment, pp. 38-39.

Any attempt to divide a large region into areas and to generalize about the characteristics of the people residing in these sections is fraught with danger. However, for purposes of broad description, Alaskan natives may be grouped into four categories as follows: (1) Northern Eskimo; (2) Southern and Southwestern Eskimo and Aleut; (3) Interior Indian; and (4) Coastal or Southeastern Indian. The attached map (FIGURE 2-4) delineates the areas in which these populations live.

A more detailed linguistic division was made by Irene Reed, instructor in Eskimo languages at the University of Alaska, illustrating the language patterns traditional to the region and the current status of the native language in Alaska. (See FIGURES 2-5 and 2-6).

While the native language is moribund in some communities, since language is an integral part of culture its use as a basis for cultural classification is anthropologically sound. And where the native language is still spoken, implications are clear for educational programs which may be made available in the native tongue.

To summarize only MAJOR regional differences which exist within Alaska, the following generalizations can be made:

a. Probably the greatest single factor differentiating rural Alaska from similar areas in other parts of the United States is what Lynch has referred to as the "poverty of isolation". It is difficult for those whose daily lives are intricately involved with and sometimes controlled by telecommunications to realize the depth of poverty which can occur when American citizens have virtually no input into or even access to the lines of communication which tie our country together. The entire state of Alaska can be considered an impoverished area in terms of communications, since only a single community (Anchorage) even occasionally received direct television coverage of subjects of national interest (typically such direct national coverage includes football games rather than news of national or international concern). However, rural inhabitants who can receive television beams from stations in Anchorage, Fairbanks, Juneau, Ketchikan, and Nome have at least some regular contact with the world outside their isolated communities. However, most Alaskan communities have little contact with television programs. Few villagers have telephones. Indeed, in most rural communities the major medium for obtaining information or for communicating with the outside world is the radio.

b. Greater concern exists among Northern and Southwestern Eskimos that their children be educated in or near their home communities than is expressed by Southeastern Alaskan parents. At a recent meeting of the Alaska State Board of Education, advisory school board members from Southeastern Alaska represented their constituents in expressing a strong desire that children

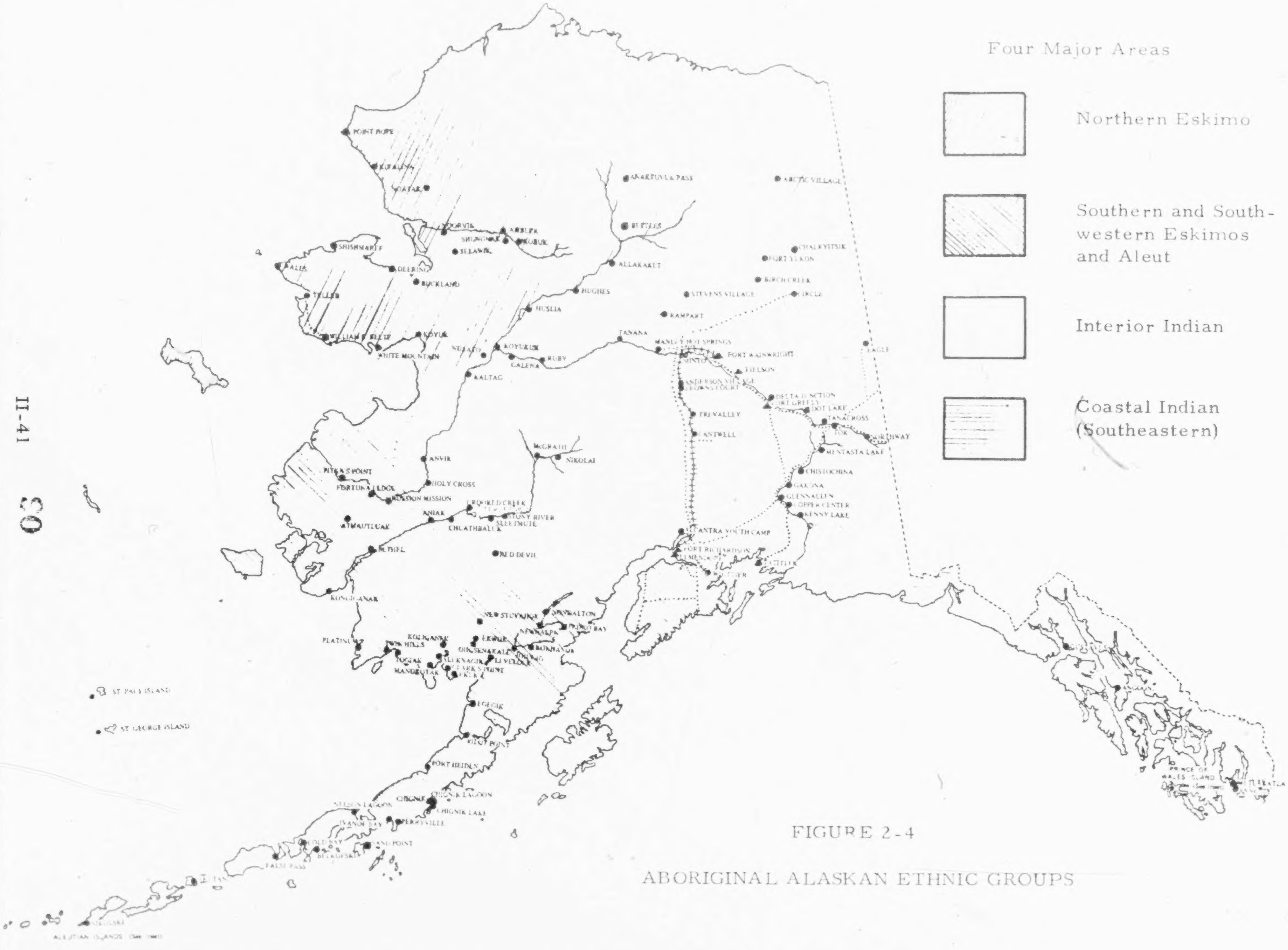
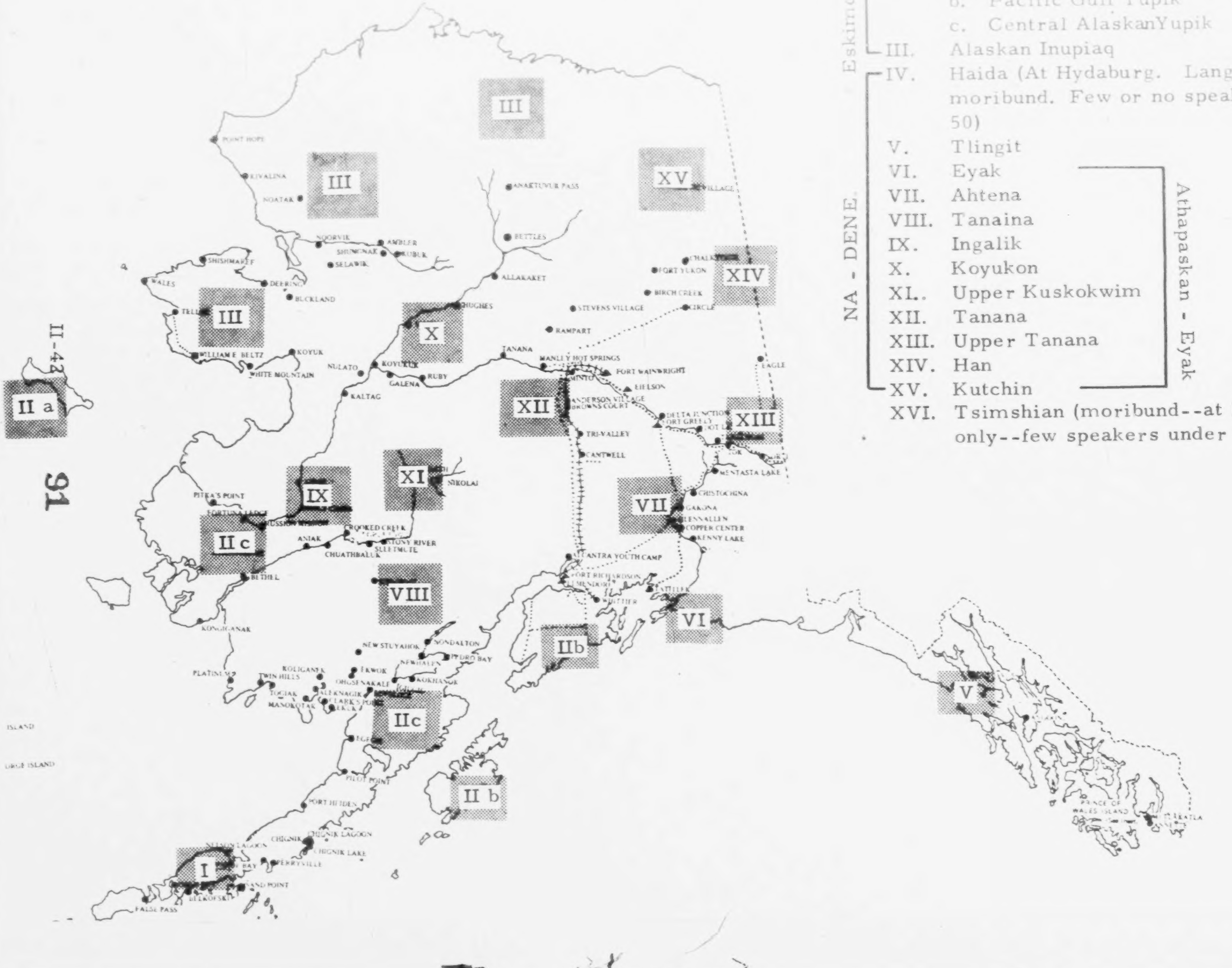

Four Major Areas
Northern Eskimo
Southern and Southwestern Eskimos and Aleut
Interior Indian
Coastal Indian (Southeastern)
POINT HOPE
KIVALINA
NOATAK
NOORVIK
AMBLER
SHUNGNAK
KOBUK
SELAWIK
SHISHMAREF
WALES
DEERING
BUCKLAND
TELLER
WILLIAM
BELTZ
KOYUK
WHITE MOUNTAIN
NULATO
KOYUKUK
GALENA
RUBY
KALTAG
HUSLIA
HUGHES
ALLAKAKET
BETTLES
ANAKTUVUK PASS
ARCTIC VILLAGE
CHALKYITSIK
FORT YUKON
BIRCH CREEK
CIRCLE
STEVENS VILLAGE
RAMPART
TANANA
MANLEY HOT SPRINGS
MINTO
FORT WAINWRIGHT
EIELSON
ANDERSON VILLAGE
BROWNS COURT
DELTA JUNCTION
FORT GREELY
DOT LAKE
TANACROSS
TOK
NORTHWAY
EAGLE
TRI VALLEY
CANTWELL
MENTASTA LAKE
CHISTOCHINA
GAKONA
GLENNALLEN
COPPER CENTER
KENNY LAKE
ALCANTRA YOUTH CAMP
FORT RICHARDSON
ELMENDORF
WHITTIER
TATITLEK
ANVIK
HOLY CROSS
PITKAS POINT
FORTUNA LEDGE
RUSSIAN MISSION
ANIAK
CROOKED CREEK
STONY RIVER
SLEETMUTE
CHUATHBALUK
McGRATH
NIKOLAI
RED DEVIL
ATMAUTLUAK
BETHEL
KONGIGANAK
NEW STUYAHOK
NONDALTON
PEDRO BAY
NEWHALEN
KOKHANOK
EKWOK
DILLINGHAM
IGIUGIG
LEVELOCK
KOLIGANEK
TWIN HILLS
TOGIAK
MANOKOTAK
ALEKNAGIK
CLARKS POINT
EKUK
PLATINUM
EGEGIK
PILOT POINT
PORT HEIDEN
CHIGNIK
CHIGNIK LAGOON
CHIGNIK LAKE
PERRYVILLE
NELSON LAGOON
IVANOF BAY
COLD BAY
BELKOFSKI
SAND POINT
FALSE PASS
ST PAUL ISLAND
ST GEORGE ISLAND
NIKOLSKI
ALEUTIAN ISLANDS (See Inset)
PRINCE OF WALES ISLAND

FIGURE 2-4

ABORIGINAL ALASKAN ETHNIC GROUPS

FIGURE 2-5
LINGUISTIC BREAKDOWN


III
III
III
XV
XIV
X
XII
XIII
XI
IX
II c
VII
VIII
VI
IIb
II a
V
IIc
II b
I
POINT HOPE
KIVALINA
NOATAK
NOORVIK
SHUNGNAK
KOBUK
AMBLER
SELAWIK
SHISHMAREF
WALES
DEERING
BUCKLAND
TELLER
WILLIAM E. BELTZ
KOYUK
WHITE MOUNTAIN
NULATO
KOYUKUK
GALENA
RUBY
KALTAG
HUGHES
ALLAKAKET
BETTLES
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BIRCH CREEK
CIRCLE
STEVENS VILLAGE
RAMPART
TANANA
MANLEY HOT SPRINGS
MINTO
FORT WAINWRIGHT
EIELSON
ANDERSON VILLAGE
BROWNS COURT
TRI-VALLEY
CANTWELL
EAGLE
DELTA JUNCTION
FORT GREELY
TOK
MENTASTA LAKE
CHISTOCHINA
GAKONA
GLENNALLEN
COPPER CENTER
KENNY LAKE
MATANUSKA YOUTH CAMP
FORT RICHARDSON
ELMENDORF
WHITTIER
CHITINA
NIKOLAI
CROOKED CREEK
STONY RIVER
SLEETMUTE
ANIAK
CHUATHBALUK
RUSSIAN MISSION
FORTUNA LEDGE
PITKA'S POINT
BETHEL
KONGIGANAK
NEW STUYAHOK
NONDALTON
ILIAMNA
PEDRO BAY
NEWHALEN
KOKHANOK
EKWOK
KOLIGANEK
TWIN HILLS
TOGIAK
MANOKOTAK
ALEKNAGIK
CLARK'S POINT
EKUK
PLATINUM
EGEGIK
PILOT POINT
PORT HEIDEN
CHIGNIK
CHIGNIK LAGOON
CHIGNIK LAKE
PERRYVILLE
NELSON LAGOON
SAND POINT
BELKOFSKI
FALSE PASS
PRINCE OF WALES ISLAND
METLAKATLA
ISLAND

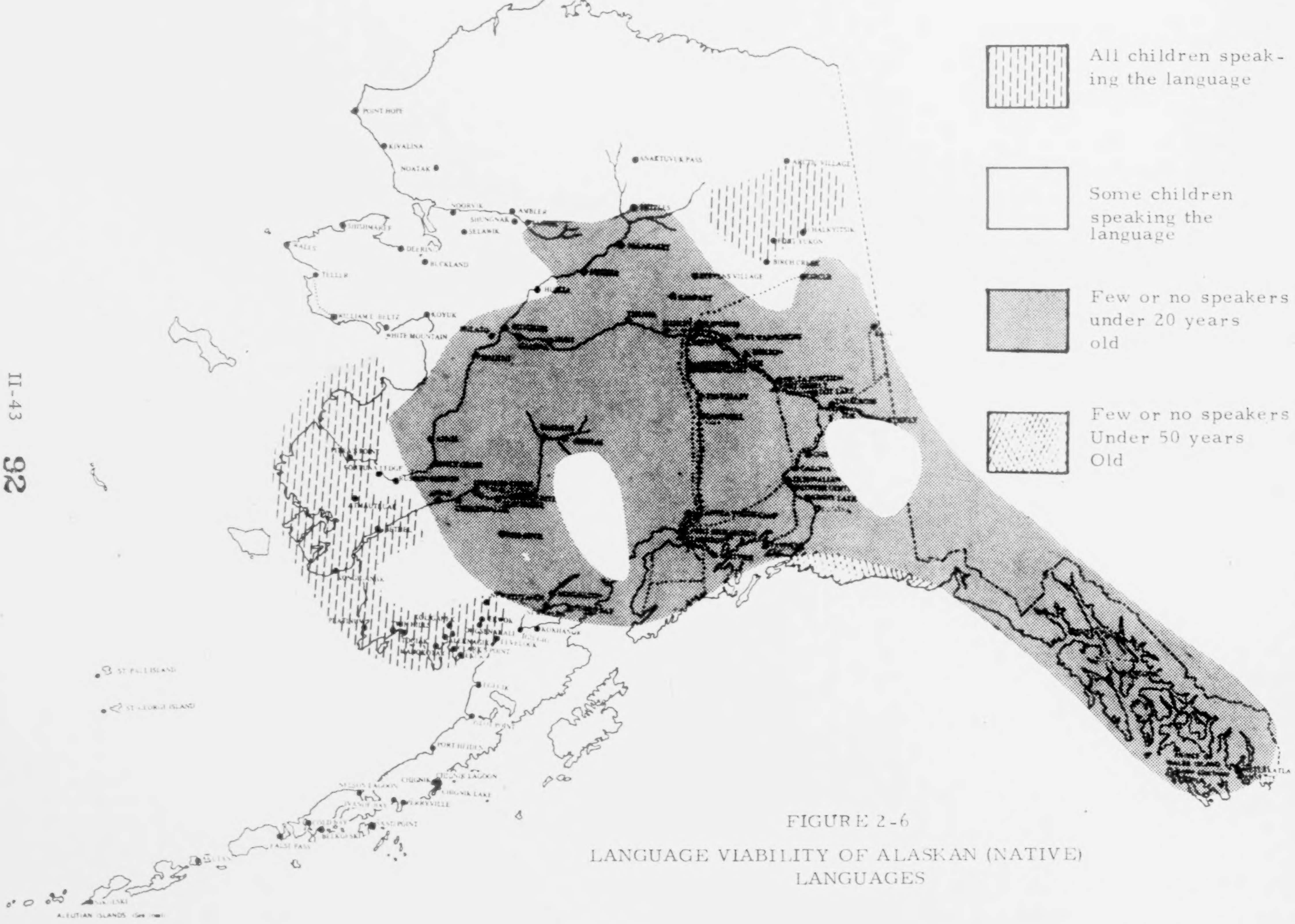
Guide to Language Breakdown on Map

Eskimo - Aleut
- I. Aleut
- II. Yupik Eskimo (3 languages)
  - a. St. Lawrence Island Yupik
  - b. Pacific Gulf Yupik
  - c. Central AlaskanYupik
- III. Alaskan Inupiaq

NA - DENE.
- IV. Haida (At Hydaburg. Language moribund. Few or no speakers under 50)
- V. Tlingit

Athapaskan - Eyak
- VI. Eyak
- VII. Ahtena
- VIII. Tanaina
- IX. Ingalik
- X. Koyukon
- XI.. Upper Kuskokwim
- XII. Tanana
- XIII. Upper Tanana
- XIV. Han
- XV. Kutchin

- XVI. Tsimshian (moribund--at Metlakatla only--few speakers under 50)



All children speaking the language
Some children speaking the language
Few or no speakers under 20 years old
Few or no speakers Under 50 years Old
POINT HOPE
KIVALINA
NOATAK
NOORVIK
AMBLER
SHUNGNAK
SELAWIK
SHISHMAREF
WALES
DEERING
BUCKLAND
TELLER
KOYUK
WHITE MOUNTAIN
ANAKTUVUK PASS
ARCTIC VILLAGE
FORT YUKON
BIRCH CREEK
ST. PAUL ISLAND
ST. GEORGE ISLAND
PORT HEIDEN
CHIGNIK
CHIGNIK LAGOON
CHIGNIK LAKE
PERRYVILLE
SAND POINT
FALSE PASS
NELSON LAGOON
ALEUTIAN ISLANDS

FIGURE 2-6

LANGUAGE VIABILITY OF ALASKAN (NATIVE) LANGUAGES in Southeastern communities be prepared, through adequate education, to compete in life with members of the dominant society, even if it meant attending school away from home.[66] At the same meeting, representatives of Eskimo communities emphasized the prime desire of parents that their children retain close home ties. They also expressed the hope that parents and children would not suffer prolonged separation.[67]

c. The need for adequate communication skills exists throughout the state, but regional differences in the degree of language handicap are enormous. Test results (while culturally biased), the linguistic maps, and studies of language patterns of children entering school show major regional differences.

d. Career education is urgently needed by rural Alaskans. But types of employment for which people should be prepared varies from region to region. Fishing and timber industries provide major employment opportunities in Southeastern coastal communities. However, in many areas of the state, no viable economic base now exists. Therefore, educational implications suggest that the population must be made aware of economic opportunities in other regions of the state or that new industries must be developed in local communities.

e. Safety education is a common problem for all Alaskans. However, it will vary in specificity according to local needs. Information about water safety and the ability to swim (if only a few strokes) are vital to those living in coastal areas or near river banks. Needless to say, treatment of frostbite is of greater concern to those in Arctic regions of the state than to those in Southeastern.

f. Although a need common throughout Alaska, adult basic education will vary in terms of community requirements according to the current educational attainment of those for whom the programs are designed. Southwestern Alaska is the area of greatest need in terms of being the region with the lowest level of educational achievement.

Most of the remaining educational needs which are discussed are common to inhabitants throughout the state (e. g., positive self-concept, good mental health, etc.), although educational programs should be tailored to the individual school and community.

Any treatment of educational needs with program implications for rural Alaska should take into account basic differences in learning styles between Alaskan natives and middle class Caucasians. In their learning styles rural Alaskans tend to be more literal than their white counterparts. Eskimo youth tend to learn more effectively from visual rather than from verbal stimuli.[68] Indian children tend to withdraw from uncomfortable situations, and their behavior may be misinterpreted as "sullen" or defiant.

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[66] "Minutes of the Alaska State Board of Education, Fourteenth Session," Anchorage, Alaska, February 25-26, 1971, (Juneau, Alaska: Alaska Department of Education), pp. 2-4. (Mimeographed.)

[67] Ibid.

Rider highlights some of these differences in learning styles by contrasting how Eskimo children in Bethel learn in comparison with middle-class urban children.[69]

Middle Class Urban	Eskimo in Home
Adults participate in children's activities.	Children participate in adult activities
Children learn through artificial media: media: television, radio, written, etc.	Children learn through natural media: tundra, people, etc.
Children are used to verbal communication	Children are used to non-verbal communication
Children are told how things are done	Children learn through observation
Children are protected from making mistakes	Children learn from trial and error
Children are taken for grated when they succeed	Children are rewarded when they succeed
At an early age children's time reference is "future"oriented	At an early age children's time reference is "now" oriented
At an early age children are taught the use of symbols	At an early age children are taught the use of objects
Children learn to compete	Children learn to share
Children learn mastery over nature	Children learn harmony with nature
Children learn strict adherence to time schedules	Children learn unhurried, inexact time schedules
Children learn scientific explanations for natural phenomena	Children learn non-scientific explanations for natural phenomena

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[68] Judith Kleinfield, "Cognitive Strengths of Eskimos and Implications for Education", ISEGR Occasional Papers, No. 3 (Fairbanks, Alaska: Institute of Social, Economic and Government Research, University of Alaska, November, 1970), p. 14.

[69] Rider, " 'First Generation' and Competency-Based Teacher Training, " pp. 11-12.

Middle-Class Urban	Eskimo in Home
Children learn to save for the future	Children learn that if an individual saves or has too much, he may be considered selfish or stingy
Children learn that everyone should try to climb the ladder of success	Children learn that success rests more in being a good person than in acquiring goods.
Children reason deductively at an early age	Children reason inductively at an early age[70]

Detailed treatment of these distinctions in values and learning styles should comprise a major portion of the pre-service and in-service education of teachers in rural schools.

2.4 COMMUNICATIONS REQUIREMENTS FOR SCHOOL OPERATIONS

The educational community which serves Alaska's rural peoples basically has need for two types of communications services: Administrative and Instructional.

2.4.1 Administrative

Administrative Communications requirements include the need for communications for administrative and supervisory purposes between the headquarters school in each region and the schools in that region. Any communications system designed to serve rural Alaska must make provision for instantaneous communication beyween the Area Superintendent and each of the schools under his supervision. Such a system would make possible high quality voice signal with two-way capability that would enable the superintendent to talk on a daily basis (or oftener, on an emergency basis when the need arose) with the schools in his jurisdiction. As a first communications priority, we recommend that both signal strength and signal quality be improved substantially so that top-notch administrative communications can become a reality.

2.4.2 Instructional

Instructional Communications requirements, on the other hand, refer to teacher-to-teacher and/or community-to-community communications needs (1) between schools within a given region or (2) between schools in one region and schools in another region of the state. An example of the first type would be communications between Barrow and Prudhoe Bay or between Fort Yukon and Arctic Village, or Barrow and Barter Island. The latter category might further be subdivided as follows: (a) communications between small schools in one region with small schools outside that region (e. g., Arctic Village and Wainwright; or Unalakleet and Fort Yukon; (b) communications between large schools in one region and large schools in another region (e. g., Bethel and Barrow or Nome and Kotzebeu); (c) communications between large schools in one region and small schools in another region, or vice versa (e. g., Bethel and Wainwright, or Kodiak and Savoonga).

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[70] Ibid.

The essential concept to be emphasized is that the size of the school is more important to the nature of the problem than the geographic region in which the school is located, provided both schools are in the same cultural environment. Communications among small schools regardless of the region would receive highest priority. Next priority would be communications among large schools with the last priority being given to communications between large and small schools in different regions of the state.

The above priority listing represents our best judgment of the communications flow within and between the villages. We reason that top priority should be given to communications between small communities either in the same region or in different regions of the state. Teachers in one or two teacher schools find themselves in the isolation of small village communities with no other teachers to talk to regarding professional or instructional problems. They have an urgent need to communicate with teachers in other small villages who face similar problems to theirs. Likewise, teachers in large schools have more to talk over with teachers in similar situations to their own in other large cities. Here, regional geographical barriers vanish and the Barrow and Bethel teachers can exchange points of view, practices, teaching strategies and insights.

All of the teachers contacted by the Teleconsult field team stressed the need for openness in the communications system so that a minimum of switching and control by the headquarters school would be necessary. The teachers seem concerned about the rules and regulations which the administration in the headquarters school might set up to control communications between villages (i. e, only once per week or only two calls per month). They point out that these rules, if highly restrictive, not only could prevent free flow of information between the villages, but would actually determine the ways in which materials are used in the classroom.

One regional communications need also stands out in bold relief. One team's visit to Barrow emphasized the need for open communications to all locations on the North Slope area due to the oil company activities. They envision, for example, the need for a hot line to jobs available at any given time on the North Slope.

2.5 SUMMARY OF FINDINGS AND PROPOSED PROGRAMS

We have arrived at some observations on the overall situation, i. e., communications problems existent in a vast area, sparse population, isolated regions and limited community resources. The common persistent needs of Alaskan rural peoples in all regions of the state were explored in six categories: i. e, early childhood, elementary, secondary, higher, adult education, and professional training of teachers and other rural workers.

There are ten persistent needs which seem to be common to all rural regions of the state:

1. Development of self-concept and pride in heritage
2. Development of personal communications skills (verbal abilities and reading comprehension)
3. Career education and need to learn skills in earning a living
4. Development of independent thought, critical thinking
5. Personal health and hygiene; mental health; nutrition sanitation
6. Consumer education and business methods
7. Use of leisure time
8. Making school a more exciting place than it now is (to increase "holding power" of the schools)
9. Training of Natives as teacher and health aides
10. Better communications between villages; i. e., people-to-people and people to government.

The above needs were further translated into concrete programs based on the following guiding principles:

A. In all programs, every effort should be made to:

   i. increase relevance of materials
   ii. counter isolation
   iii. increase parent and community involvement
   iv. increase self-instructional possibilities
   v. equalize educational opportunities between rural and urban Alaska
   vi. Share scarce resources with remote villages

B. Use techniques such as

- i. local production
- ii. cross-cultural emphasis
- iii. communication from and to natives
- iv. adapting materials for self-instructional use
- v. parents as teachers aides.

The proposed programs were classified according to the following categories:

- A. Teachers in-service
- B. Native culture and pride
- C. News: local, state, national and international
- D. Language development
- E. High school completion
- F. Pre-school
- G. Consumer Education
- H. Leisure time
- I. Careers and jobs
- J. Health and safety
- K. Foods
- L. Business and economics
- M. Mental health
- N. Adult and parent education
- O. Communication needs
- P. In-school curriculum needs
- Q. Citizen participation in government.

The above programs are described in tables depicting WHAT is needed, to WHOM it addresses, WHERE it might be originated, WHEN and frequency such need arises, and finally the ultimate END such program is designed to achieve. There is inevitably certain cross-utilization amongst such wide range of programs in that some of them will serve more than one objective. A sample of proposed programs for service prescription is given in Table 2-9. The ranking of categories in this tabulation does not suggest equivalent ranking in need priorities.

	Categories	No. of Programs
A.	TEACHER IN-SERVICE	6
B.	NATIVE CULTURE AND PRICE	8
C.	NEWS: LOCAL, STATE, NATIONAL AND INTERNATIONAL	2
D.	LANGUAGE DEVELOPMENT	3
E.	HIGH SCHOOL COMPLETION	2
F.	PRE-SCHOOL	1
G.	CONSUMER EDUCATION	2
H.	LEISURE TIME	1

	Categories	No. of Programs
I.	CAREERS AND JOBS	8
J.	HEALTH AND SAFETY	9
K.	FOODS	3
L.	BUSINESS AND ECONOMICS	3
M.	MENTAL HEALTH	2
N.	ADULT AND PARENT EDUCATION	9
O.	COMMUNICATION NEEDS	6
P.	IN-SCHOOL CURRICULUM NEEDS	2
Q.	CITIZEN PARTICIPATION IN GOVERNMENT	3

TABLE 2-9

PROPOSED EDUCATIONAL PROGRAMS FOR SERVICE PRESCRIPTION

WHAT	ORIGINATION DESTINATION	TIME FREQUENCY	END
A. TEACHER IN SERVICE			
A-1 Professional development experiences for the 100 new Alaskan teachers & those who are being transferred to new regions of Alaska. These training programs would provide information about the culture, village life, life style, value systems of residents, community power structure & the whereabouts of Alaskan backup teaching resources.	Univ. of Alaska Fairbanks/Anchorage New teachers in Alaska & teachers being transferred.	Min. 2 weeks prior to beginning of school & during 1st semester once per week	Avoidance of cultural shock; better school-community relations, improved education through more appropriate village understanding and teaching techniques.
A-2 Teacher forum - a two-way exchange of ideas and questions & answer opportunity between teachers and teachers, teachers and "experts," and between teachers and administration support services. Teachers may "call in" problems, questions. Answers or suggestions given within 5 days (perhaps RFD Wisconsin experiment has tested procedures that could be considered).	e.g. Barrow/Bethel Wainwright/Barter Island Kotzebue/Nome Kotzebue/Barrow between teachers in villages with like environment	late afternoon or evenings twice weekly	Counter teacher isolation; provide immediate problem-solving help to teachers on their own in a strange environment.
A-3 Teaching strategies appropriate for minority children.	Univ. of Alaska/Fairbanks All teachers in rural areas	After school once every other week	Improvement of instruction, how to get the most out of materials available as well as outside resources.
A-4 Culturally relevant teaching materials and resources; what resources are available; where they can be obtained & under what conditions; how they can be used most effectively. The absence of relevant instructional materials has been especially hurtful in schools serving largely Eskimos, Aleut or Indian populations.	Univ. of Alaska/Fairbanks Teachers	After school, nights and weekends 2 per week	Improvement of instruction; isolation; continuing education while on the job.

WHAT	ORIGINATION DESTINATION	TIME FREQUENCY	END
A-5 Effective utilization of educational technology in the classroom: how to use films, radio, television & other media with maximum effectiveness in the classroom.	Anchorage SOS Schools All teachers in rural areas	After school once weekly	Improvement of instruction; how to get the most out of materials available as well as outside resources.
A-6 In-service program materials for teachers in each content area of the curriculum and in strategies of teaching.	Univ. of Alaska/Fairbanks All teachers	After school hours once weekly	Improvement of instruction; overcoming isolation; need to discard obsolete teaching methods & curriculum.
A-7 Extension credit courses for teachers. These courses should be accredited with one or more of Alaska's universities or with universities in the lower 48.	Univ. of Alaska/Fairbanks Teachers	After school nights & weekends 2 per week	Improvement of instruction; isolation; continuing education while on the job.
A-8 Minicourses for teachers, which enable teachers to rapidly acquire & improve their basic teaching skills in order to produce dramatic benefits in pupil performance. Minicourses can be either in-service or preservice in nature. The Far West Laboratory for Educational Research & Development has developed a series of teacher-training minicourses which might well be used with Alaska teachers.	No broadcast time needed Materials & tapes in each village Teachers	15 hrs. during the semester-about 3 hrs. per week for 5 wks. with monthly follow-up lessons to maintain & reinforce acquired skills. Used on location, no transmission time needed.	Self-evaluation wherein a video recorder is used to produce tapes of a teacher's performance so that he might see himself at work with students & evaluate his own performance.

WHAT	ORIGINATION DESTINATION	TIME FREQUENCY	END
A-9 A series of cultural heritage broadcasts dealing with social problems of a society in transition. Such a series could provide a summary of problems facing Alaska natives today. The broadcasts should open up suggested solutions to the problems if they are to be geared to the villagers as well as to the teachers who are newcomers to Alaska.	Univ. of Alaska/Fairbanks Teachers new to Alaska & native villagers.	Weekends or (if satellite communication is used) an indoctrination course for teachers. once per month	Acquaint teachers new to Alaska with problems facing Alaskan natives today.
B. NATIVE CULTURE AND PRIDE			
B-1 Dramatized story hour via radio featuring folk tales and legends, first of Eskimos and Alaskan Indian culture, gradually introducing those of other Indian cultures and more foreign countries; in English, repeated in native language where appropriate. Hopefully program origination might be from various regions of the state, maybe using native storytellers, musicians, etc.	Anchorage and at regional headquarters Preschool pupiles, elementary children, elementary teachers and parents	After school hours and/or on weekends 3 per week (Tu, Th&Fri) during school	Cultural identity and pride; preservation of culture.
B-2 Alaskan history - including the sociological, economic and art forms and so forth.	Anchorage Upper elementary, secondary adult including teachers and people in the lower 48	During school day Daily	Identity, improved inter-regional understanding within the state and improved self-image.
B-3 A weekly series of programs devoted to leisure time pursuits appropriate to rural, isolated Alaska and encouraging local initiative in "follow-up" activities & providing for inter-village displays, competitions & so forth, e.g., toys that could be made for children or children could make for themselves; encourage village displays of needlework, carvings and so forth with displays shared via TV.	Anchorage All ages	Weekends once per week	Counter isolation; make rural life more pleasant and endurable; give something better than alcohol for unemployed & so forth; enhance self-image.

WHAT	ORIGINATION — DESTINATION	TIME — FREQUENCY	END
B-4 Natives "telling their own story," using media to produce their own messages to communicate with each other, with their governmental and civil leaders, and with other native groups in Alaska. (e.g., a visual letter from Stebbins to the Governor and Legislature on Stebbins' problems) Each village will create programs.	Anchorage and each regional headquarters — Adults and high school students	During school day and on weekends — 2 per week	Overcoming civic isolation; development of communications skills; development of self-concept.
B-5 Understanding our Neighbors - materials by Alaskans, for Alaskans, about Alaskans: materials that express their views, culture and concerns; what life is like in other rural communities of the state; hopes and dreams of the peoples themselves and how they feel about things; helping Caucasian Alaskans to understand the Alaskan rural native populations.	Anchorage — Rural Alaskans Caucasian Alaskans (the 4/5 of the population not of Indian, Eskimo or Aleutian stock).	Nights and weekends — once per week	Cross-cultural understanding between all of Alaska's peoples
B-6 Need to provide alternatives for village youth. Materials are needed that will show the advantages of rural life as well as urban, the problems likely to be encountered when moving from the village to the urban centers and that show how rural living can be made much more exciting than it now is; economic advantages of both life styles should be pointed out.	Anchorage — High school students and young adults	During school day — once per week	Native pride and accomplishment; pride in heritage, economic self-sufficiency.
B-7 Course in appropriate native languages for the white man, as denoted by map showing linguistic heritage.	Univ. of Alaska/Fairbanks — Teachers and Caucasian Alaskans	Nights and weekends — 2 per week	To bring about greater appreciation by white men of native culture and language.
B-8 Town meetings on problems facing rural Alaskans. These can be broadcast live throughout Alaska via satellite and make possible communication between peoples in all parts of rural Alaska and in urban centers as well. Problems could center on issues of mutual concern, i.e., housing, water & sewage, fire prevention, cooperatives, consumer education, alcoholism, water pollution.	Fairbanks with other origination in major villages — Council presidents, community leaders	Nights or weekends — one per month	Increasing involvement of rural Alaskans in solving own problems; overcoming civic isolation;bringing about a greater voice in issues affecting them.

WHAT	ORIGINATION DESTINATION	TIME FREQUENCY	END
C. NEWS: LOCAL, STATE, NATIONAL & INTERNATIONAL			
C-1 News via TV starting with local, moving to state, national and international in that order within the same program; in English, repeated in native language where appropriate. Local area could prepare via videotape input for the state news in their region.	Nome, Bethel, Barrow, Juneau, Fairbanks and Washington, D. C. Upper elementary through adult	Opening of school hour and/or post-school Daily	Counter isolation: see their community as a part of the greater whole: increase involvement.
C-2 same as B-8			
C-3 News Service for Alaska's Teachers to keep them abreast of new happenings in education in Alaska and the lower 48: innovations, new teaching techniques, and current developments in educational research. Feedback would be desirable so teachers could ask questions. It is anticipated that some programs would originate in the studios of NEA in Washington, D. C. In any event audio feedback would be needed between the Washington studios and Alaska via ATS-F or G.	Fairbanks and Washington, D.C. Teachers	After school hours once weekly	Counter isolation from their colleagues in lower 48 and from mainstream of educational advance in rest of U.S.; to provide emotional & intellectual support needed by the rural teacher; improve teacher morale & lessen attrition among teachers.
C-4 On-the-spot coverage of events within the local village by use of porta- k video equipment & videorecorders for later play on broadcast or CATV, or for showing in village centers. This would be a community candid camera event, including interviews with interesting community members.	On location in village Entire community	Weekends or nights Bi-weekly on air	Improve community relations; develop pride in local community and culture.
D. LANGUAGE DEVELOPMENT			
D-1 Precision English patterned after the Guam experiment but given an Alaskan focus. (In Guam experiment, English was taught via videotape to improve oral language & comprehension skills of native children.)	Fairbanks Secondary school students & adults (perhaps upper elementary also)	During school hours Daily M-F	Identity, improved interregional understanding within state & improved self-image.

WHAT	ORIGINATION DESTINATION	TIME FREQUENCY	END
D-2 same as B-4			
D-3 Direct classroom support in area of language development. Teachers have identified this as a basic need both for in-service training and for classroom instruction. Previous experiments in this area have been handicapped by a most unreliable satellite signal which made it difficult for children with a language problem and with hearing loss to understand.	Fairbanks Students and teachers	During school day Dailu M-F	Improved language communications skills.
E. HIGH SCHOOL COMPLETION			
E-1 High school completion package. Using satellite communication and other inter-related media, adapt the available high school completion correspondence courses for self-instruction or instruction with limited teacher assistance.	Fairbanks High school students especially in isolated areas, dropouts, and adults	During day & repeated at night Daily M-F	Counter the need for high school age students in very isolated areas to leave home to continue education by offering the min. requirements for high school graduation by alternate method to formal high school attendance; assistance as a supplemental program in the high school; opportunity for dropouts & adults to expand their education.
F. PRE-SCHOOL			
F-1 Head Start package-one or more TV programs to offer "kindergarten type" experiences for pre-schoolers. One program might be an adaptation of Sesame Street for Alaskan children. A weekly program for mothers re "helping your child prepare for school," could be part of the package.	Fairbanks Pre-schoolers and parents	Daytime hours weekly	Environmental enrichment; preparation for success in school, improved school community relations.

WHAT	ORIGINATION DESTINATION	TIME FREQUENCY	END
G. CONSUMER EDUCATION			
G-1 A weekly series of programs. Each program devoted to a discrete topic of consumer education, e.g., extending budgets for food, housing, insurance, health care, how to figure taxes and so forth. Specific topics to be guided by information requests continually solicited from the field (surveys and from listeners)	Anchorage Secondary school students and adults	During school & repeated at night weekly	Improve standard of living by extending limited resources.
G-2 A "Julia Childs of the North" - a series of practical programs re selecting, preserving and preparing foods available in the villages.	Anchorage High school girls and adult women	During the day weekly	Improved health and nutrition; better use of resources; improve self-image.
G-3 see L-2			
H. LEISURE TIME			
H-1 same as B-3			
I. CAREERS AND JOBS			
I-1 Career information for elementary children including occupations available within villages of the region and those most commonly available to those who leave the villages; probably a different program series for various regions of the state would be required.	Bethel, Barrow, Nome, Fairbanks, Kodiak, Elementary school children	During school hours 2 per week	Provide otherwise unavailable data; start easing acculturation process.
I-2 Specific vocational training for occupations which offer good employment opportunities. These might vary from region to region and would include placement opportunities, knowledge of living conditions and so forth to be encountered if employment is in a new community.	Bethel, Barrow, Nome, Fairbanks, Anchoarge, Kodiak High school students and adults	In English, during day repeated in native language if necessary at night weekly	Reduce unemployment, increase vision re possibilities; prepare future employees for the transition.

WHAT	ORIGINATION — DESTINATION	TIME — FREQUENCY	END
I-3 A series of program materials dealing with general "world of work" information, e.g., finding employment, making an application, moving to a new environment, unemployment insurance, workmen's compensation, organizing a cooperative, legal problems, marketing products such as home industry, tax problems, Social Security, etc.	Anchorage — High school students and adults	In English, during day, repeated in native language if necessary at night — weekly	Improved occupational orientation & effectiveness; increased community involvement & sense of belonging.
I-4 "Hot Line to Jobs" - an opportunity for two-way communication between villagers and manpower training staff re temporary and/or permanent jobs which exist throughout the state and in the lower 48 which would be of special interest to rural Alaskans. Specific information would be given re seasonal employment opportunities; places in the state where jobs are available; specific job skills required for these jobs; creating self-employment opportunities (i.e., operative fisheries, reindeer herds, trapping, arts & crafts coops, etc.; to keep abreast of new job sources.	Anchorage — General adult audiences	Evenings — Weekly	Reduce unemployment, point up year-round job and seasonal job opportunities; ways of forming cooperatives and building self-employment, self-respect.
I-5 "Cooperatives" - a series of program materials dealing with cooperative community business ventures, such as the formation of cooperatives, ways to begin, problems of small business management, operational techniques.	Anchorage, Bethel — Adult community leaders	Evenings — Weekly	Encourage self-employment of native peoples.
I-6 Arctic Grapevine: Hot line to jobs on the North Slope. Career opportunities for natives (in conjunction with oil companies)	Barrow, Nome — Unemployed adults	— Bi-monthly	Reduce unemployment.
I-7 Training for Arctic Grapevine. Utilizing resource support personnel from Arctic Research Lab to train natives for mechanical and other jobs.	Barrow, Nome — Adults	If a course daily (M-F), if not, a course weekly — once or twice monthly	Training for jobs, reduce unemployment.

WHAT	ORIGINATION DESTINATION	TIME FREQUENCY	END
I-8 Teaching as a Career. A series of programs to interest native young people to choose teaching as a career. Series should show the excitement of teaching.	Fairbanks Upper elementary and junion high school students	once or twice monthly	Occupational orientation.
J. HEALTH AND SAFETY			
J-1 A series of program materials of general interest and practical usefulness dealing with health, safety (including survival techniques) and nutrition.	Anchorage, Barrow, Bethel General audience	After school weekly	Survival; reduction of accidents; improve health practices.
J-2 A program series for parents on child care and development, recognition of early symptons of disease, prenatal care, child hygiene and emotional health of children.	Anchorage Parents and teachers	After school hours, some during school day weekly	Parent education which is key to improvement of health conditions throughout Alaska
J-3 same as B-6			
J-4 Training of native health aides. Materials and media which can be used as training devices for community health aides in first aid, disease recognition, community health problems, dietary deficiencies, illness prevention, how diseases are spread, prevention of hearing loss.	Anchorage Community health aides	Daily	Unified approach between health authorities & communities in overcoming serious health problems & to conquer disease.
J-5 Conversations between hospitalized children & their family & friends (One program of this nature has already been done with children from Hooper Bay & their parents with great success.) This technique could also be used between children in regional high schools & their families. Parents will be enabled to speak to a doctor or nurse responsible for the child & the village teacher can talk to the special hospital teacher about the child's progress in school.	Hospital location and all villages Hospitalized children or children in regional high schools and their parents	When telephone service is not available	Need to ameliorate effects of separation of hospitalized child from his home & family.

WHAT	ORIGINATION — DESTINATION	TIME — FREQUENCY	END
J-6 Programs on prevention of hearing loss.	Anchorage — Village health aides, doctors	Daily during the day	To help prevent hearing problems of children in rural Alaska.
J-7 A series of programs on alcoholism.	Anchorage — General audiences	Nights or weekends — once per week	Alcohol education; ways of combating isolation without resort to alcohol.
J-8 Survival in the North - a program series could include firearms safety, survival in storms, in water, in downed planes, on ice floes. What to do until help arrives.	Barrow, Bethel, Fairbanks — General audiences	Nights and/ or weekends — once per week	Safety education; survival; reduction of accidents
K. FOODS			
K-1 same as G-2			
K-2 Food preservation methods -- old and new.	Nome, Bethel — Adults	short series	Helping adults to find solutions to their own problems.
K-3 Building and maintenance of food freezers. Clothing design and construction (Eskimo skin clothing design)	Nome, Bethel — Adults	Short series	Helping adults to find solutions to their own problems.
L. BUSINESS AND ECONOMICS			
L-1 same as I-5			
L-2 Consumer information for natives - practical advice on handling and investing money and in purchasing goods and services.	Anchorage — Village adults	Anytime — bi-weekly	Economic self-sufficiency.

WHAT	ORIGINATION — DESTINATION	TIME — FREQUENCY	END
L-3 Tourism on the North Slope. The series should explore ways in which tourism might be made a major growth industry on the North Slope.	Barrow — Adults	at night — bi-weekly	Economic self-sufficiency
M. MENTAL HEALTH			
M-1 Understanding Ourselves: Guide to mental health - a series of programs designed to give practical help to citizens on coping with everyday problems; inter-personal relationships their own self-image; adjusting to a new and different culture.	Anchorage — High school students and adults	during school day — daily	Self-respect and understanding; enhanced self-image; social competence.
M-2 same as J-2			
N. ADULT AND PARENT EDUCATION			
N-1 same as I-5			
N-2 same as L-2			
N-3 same as M-1			
N-4 same as J-2			
N-5 same as B-4			
N-6 Round table discussions which provide ideas to native communities that will help them cope with the changes in their lives. Information can be given on such things as: snow machine operation, alcoholism, venereal disease, employment programs, land claims & education. (a few of these have already been started via satellite with considerable success despite a poor signal which has plagued the system. This series has already generated requests from the villages for repeats, program tapes to be sent out, indicating that such information is fervently desired .)	Regional headquarters — Villagers, council presidents, health aides, teachers	Weekly	Overcome civic isolation; increase participation of citizens in finding solutions to their own problems; tapping outside resources for information.

WHAT	ORIGINATION — DESTINATION	TIME — FREQUENCY	END
N-7 Influence of Arctic Ocean on weather, climate, marine life, source of food supply of Alaska natives. This series should be done in conjunction with the Arctic Research Laboratory.	Barrow — Adults	Weekly for a short series	Understanding the environment and its effects on the people.
N-8 Snow machine operation and maintenance	Barrow, Anchorage — Upper elementary, adults	short series	
O. COMMUNICATION NEEDS			
O-1 same as A-2			
O-2 same as B-5			
O-3 same as B-6			
O-4 same as B-8			
O-5 same as A-6			
O-6 same as J-5			
O-7 Talk Back: a series of programs built around film footage shot by local community members or in neighboring communities which can serve as basis for community-wide discussions.	Anchorage and regional headquarters — Entire community	Weekends — Weekly	Development of independent thought and creative activity; enhance critical thinking; get community to interact about problems raised in the films.
P. IN-SCHOOL CURRICULUM			
P-1 same as A-4			
P-2 same as A-6			

WHAT	ORIGINATION — DESTINATION	TIME — FREQUENCY	END
P-3 Inquiry materials for classrooms-materials designed to develop independent and critical thought. Such materials-segments, episodes, short sequences-could be designed to present raw data from which learners must themselves make conclusions or value judgments. They could be designed to elicit student responses by posing problems, raising unanswered questions, providing for student participation during the program, providing pauses or silences during the program for assimilation; providing for more cliff hangers and open-ended program materials for students to discuss.	Anchorage — Students at all grade levels.	During in-school classroom day — whenever teachers need arises	To develop independent thought and critical thinking and help youngsters make decisions for themselves.
P-4 Organizing learning centers within elementary classrooms. These learning centers would provide places within the classroom for using and storing materials that relate to a special interest or curriculum area (i.e., science, language arts, social studies), or they could be organized as listening or viewing centers; reading centers, writing centers, arts and crafts centers, etc. These centers would give children a more open environment in which to work and would help them to become increasingly responsible learners.	No broadcast time needed — Elementary pupils	in-school, throughout the state	Provide children with more freedom for independent activities.
Q. CITIZEN PARTICIPATION IN GOVERNMENT			
Q-1 same as B-4			
Q-2 same as B-8			
Q-3 same as N-6			

CHAPTER III

INSTRUCTIONAL TECHNOLOGY OPTIONS

3.1 INTRODUCTION

Important elements of any educational telecommunications system are the instructional media to be transmitted and the adaptation of the media to provide maximum benefits to the learner.

The term, Instructional Technology, formerly encompassed any media which could be used alongside the teacher for instructional purposes. These media are still used but more or less in isolation. However, a useful and commonly accepted definition of instructional technology nowadays is a systematic way of designing, interacting and evaluating the total process of learning in terms of specific objectives. These objectives use a combination of human and media to effect better learning.

The proper integration of educational goals, instructional media and a delivery system is of prime importance in this endeavor. The option facing the designer when assessing the capability and the feasibility of a telecommunications network for educational use for a state such as Alaska is to recognize that there are three levels of decision making — all of which are equally critical — and must be carried out with full awareness of how each can contaminate the other.

First, a well designed instructional package or system is relatively ineffectual if it cannot have an adequate delivery system — whether that delivery system is one- or two-way radio, standard television broadcasting or programmed texts — to mention only a few possibilities. Second, the best delivery system in the world is only as effective as the instructional program it carries. And finally, both highly crafted instructional systems and well developed delivery systems are of little value without critical and valuable goals, objectives and learning outcomes relevant to the education of the learner.

We have commenced a thorough investigation of the existing technology-based curriculum materials in Alaska, and part of the collection of basic data and our preliminary analysis are contained in ANNEX C-2, 3 and 4. It is premature at this time to present our findings based on the extremely limited information available. However, it is important to present the methodology with which the incoming data will be applied to arrive at a priority ranking and recommendation of instructional media in the subsequent phase. The proposed methodology in the form of a matrix is discussed in the next section.

3.2 METHODOLOGY

It is necessary to determine the values and payoffs of using certain instructional media to meet specified need goals. The media can be evaluated on specified characteristics. The media and evaluation characteristics can be placed on x and y axis of a plane surface and evaluation scores entered at the intersections. Each need can also be provided with an evaluation surface. There are x media evaluated on y characteristics for z needs. This series of surfaces can be visualized as a three dimensional space as shown in Figure 3-1.

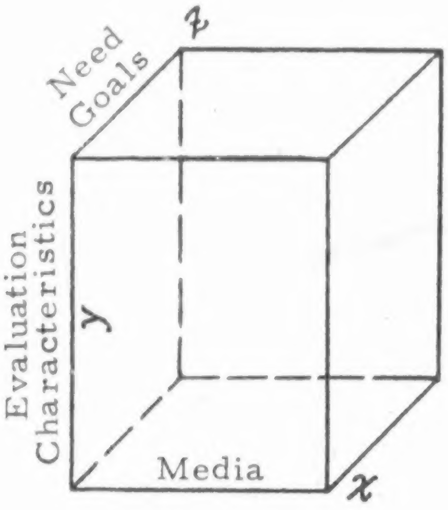

Figure 3-1
Instructional Media Matrix

This matrix is used to illustrate a series of surfaces (not a solid structure). Each of its sides is made up of a multitude of parts to be further delineated.

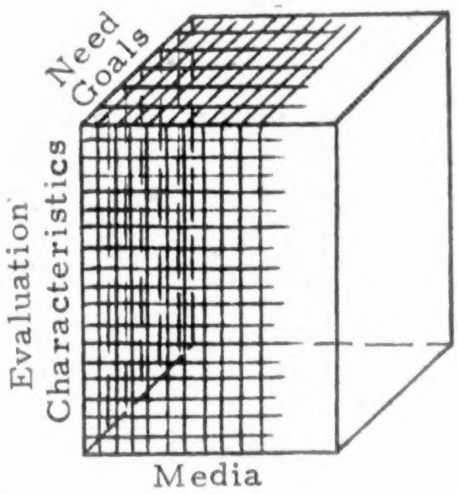

Figure 3-2
Needs, Media and Evaluation Characteristics

Figure 3-2 interrelates the surfaces to illustrate the intersection boxes.

Because there are several levels of headings for media and for need goals, it is necessary to enter averages at some places on the surfaces. Also, since some media are not appropriate to meet some needs, a "no value" statement will be possible and can be indicated by a Ø null rather than a zero.

Supplementing the matrix, value statements can also be drawn when discussing the relationship of proposed programs to the need goals. A two-way grid expresses this relationship as shown in Figure 3-3.

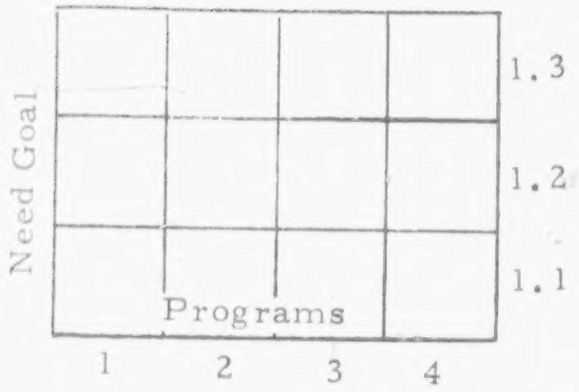

Figure 3-3

Goals and Programs Grid

Values of 0-5 (one=maximal, five=minimal) can be inserted at intersections and values given. Totals can be computed to determine what extent need goals are met by a given program. A two-way grid can also be used to further evaluate the relationship of programs to age or grade level.

A further delineation of goals, evaluation characteristics and media is given in ANNEX C-1.

3.3 CURRENT INSTRUCTIONAL TECHNOLOGY OPTIONS

The current technique in instructional technology goes beyond the traditional radio and television broadcasting. It is not likely that any one system will dominate an exclusive distribution of educational materials and information. However, the trend will probably be towards greater acceptance of electronic means of communications and the remote accessing of audio-visual educational information via telecommunications facilities. Here lies the vast potential contribution of an educational telecommunications network to improve the cost-effectiveness of the education process in rural Alaska.

The development of merging instruction with telecommunications technologies is relatively new, and techniques have grown both in ingenuity and complexity. The following discussion highlights a few of the recent developments.

3.3.1 Substitution of Transportation with Telecommunication

Electronic distribution of films will eliminate the need to physically send films from one location to another. They can be sent on demand electronically so that many schools will see what might previously have been scheduled, thus easing congestion and making it more possible to meet the learners' needs rather than the systems need in Alaska where weather causes frequent disruption of plane service. This would take the schools away from a dependency role.[1]

3.3.2 New Techniques to Reduce Transmission Time and Costs

Many picture type media, filmstrips, slides, opaques and other visuals not enhanced by sound could be distributed on a world-wide basis by satellite. Still picture television with sound can be as effective as motion pictures with lower transmission costs on a per program basis.

Using a magnetic video disc, 32 still frames can be loaded simultaneously therefore transmission time is reduced. The same disc unit can store up to 15 filmstrips of 40 frames each at one time. The potential with lower costs is to incorporate the discs into individual to receiver. Rather than using dial access information retrieval systems (computers), the Apollo Information Retrieval System could provide random access video information storage and retrieval by discs.

It is now possible to compress the sound on tape so that transmitting time can be shortened. Less tape is required and therefore can be played on less expensive audio recorders. Therefore, three alternative methods of television transmission are available: slow-scan, time-shared video with frequency shared audio; time shared video with time compressed audio. Theoretically, still picture television could provide more than 200 times as many programs as a full motion picture. Still picture television transmission can be re-recorded as limited motion pictures such as animated films are done. This makes the media more flexible with greater orchestration potential.

3.3.3 CATV-Satellite Interaction

The combination of cable with satellite systems offers opportunities of new dimensions. With a satellite, the CATV system will be able to bring in material from all over the world for local distribution. High standards and broad bases should be adhered to in selection of a cable franchise for as the technology of cable and satellite transmission change, people have an obligation to themselves and to their society to be knowledgeable of their options. In this way, they can assure that the learning system they select answers their needs and reflects the societal goals benefitting the majority of the people.

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[1] To do this, of course, will necessitate an arrangement for copyright clearances of such films. It should be noted, however, projects such as TAP funded by the U.S.O.E., materials available through the National Audio Visual Center and other government agencies provide much in the way of mediated materials which are in public domain, therefore copyright free. Other materials such as those available through the National Audio Tape Library at the University of Colorado are available at nominal fees with no charge for educational transmission.

Before the satellite is a reality with a capability able to transmit well-crafted, highly individualized learning materials, a great deal of work has to be done with respect to the present state-of-the-art materials so that materials can be individualized — which they are far from being at present. In the process of individualizing these materials, there is a need "to test the utilization of a variety of communication techniques in a satellite-related system for educational purposes."

The Federation of Rocky Mountain States plans for the use of satellite telecommunications for educational purposes call for the utilization of one-way television as well as two-way audio and computer-based techniques for early learning. This delivery system model, currently in the planning stage, may provide Alaska a fair test conceptually of a delivery system which later on can be well-adapted to the Alaska network.

The content may vary from the Rocky Mountain States to Alaska, but the process of modeling is very relevant. However, prior to the reality of a delivery system which will provide two-way computer-assisted instruction through the ATS-F and ATS-G satellite which may be related to the Mitre TICCIT type system and a DATAPLEX type system (responsive television) can be used in each learning resource center to test the materials. Some of the technical features of the Mitre TICCIT, DATAPLEX and others are discussed briefly in ANNEX C-5.

3.3.4 Instruction, Telecommunications and Computer Technology Interactions

The merger of instruction and telecommunications technologies with computer capabilities provides education with tools of great potential. A fairly comprehensive listing of the non-print media is given in ANNEX C-1.The options most closely related to the telecommunications network, in the present context, are those demanding certain video, audio transmissions and computer capabilities.

Table 3-1 offers a few typical instructional technologies and their associated telecommunications and computer capabilities.

The first category is the familiar ETV and commercial TV where only one way capability of both video and audio is required. No computer capability is needed. The additional festure of two-way audio will provide Educasting where a choice can be made amongst many audio channels for the same video presentation.

On the other hand, one-way audio with two-way video without computer capability offers such potential as the early model of DATAPLEX system where only a pseudo-two way video is available. A full capability of two-way video is obtainable from the VICOM Interactive Television System. The addition of computer capability will offer such system as the MITRE time-shared, interactive, computer-controlled, in formation television systems (TICCIT). Further

TABLE 3-1

INSTRUCTIONAL MEDIA, COMPUTER CAPABILITY AND TELECOMMUNICATIONS SYSTEM MIX

Instructional Technology	Telecommunications Requirements				Computer Capability
	Video		Audio		
	one-way	two-way	one-way	two-way	
ETV, Commercial TV	☒		☒		NO
Educasting	☒			☒	NO
Dataplex-I (pseudo two-way video) VICOM Interactive Television		☒	☒		NO
Mitre (TICCIT-I) Rocky Mountain Plans		☒	☒		YES
Mitre (TICCIT-II) & Dataplex (Interactive), AMPEX Apollo Information Retrieval		☒		☒	YES

addition of a two-way audio could offer the second generation of TICCIT coupled with DATAPLEX system, the AMPEX system, etc.

A brief description of these systems is given in ANNEX C-5.

3.4 SOME SUGGESTIONS

It is not our objective in this phase to present a comprehensive plan and recommendation in the field of instructional technology options. Such plan and recommendations must await the completion of the matrix analysis in the second phase. However, a speculative phase-development outline might serve a useful purpose at this point to set the stage for conceptual interface among the delivery system development, mediated curriculum development (MED) and management and human resources development.

Such a hypothetical plan may well be one such as that shown in Table 3-2. Some of the key elements listed therein such as the formation of regional learning resources center, the establishment of a consortium of agencies and educational institutions within Alaska to coordinate such endeavors, an interim measure of organizing a mobile airborne learning resource center before the arrival of a delivery system etc. are some of the ideas we wish to propose here in the interest of promoting discussions and exchange at this stage.

3.4.1 Regional Learning Resource Centers (LRC)

In the developing phases in future planning, a group of advocates may be developed in each village to orient the members of the village with respect to the educational technology process so that it can be used as an instrumentally effective tool in building a more effective utilization of programs.

For example, key personnel in each village must be selected who will develop the kinds of skills necessary to produce software that has a community or village type of orientation. They must also be oriented toward the use of educational technology and telecommunications for educational purposes. These favorable attitudes are critical for final assimilation of content of programs that will be carried by the hardware. Future planning and development of a significant program goal will be for every village to exploit the advantages of the educational technology process through telecommunication, through development of skills by the representatives of the village. A specific objective may be to conduct a workshop which will result in the training and organization of a learning center team within each village which can produce validated self-instructional educational materials for the village citizens. Further consultant help should be confined to devising a method for selection of potential workshop participants among the natives — not to do the actual design. We need to develop criteria for selection of participants which will depart significantly from the usual selection methods of people who have had formal training as educators. The participants should be on a cross-sectional basis through the village. Some effort on the part of the experts and consultants will be required to assess the

TABLE 3-2

PHASE DEVELOPMENT OUTLINE

Phase	Delivery System	Mediated Curriculum Development (MCD)	Management & Human Resources
Pre-Planning Phase I	Workshop	Complete Matrix	Workshop and Management System
Phase II	Pilot Learning Resource Center (LRC)	Matrix Match and Assembling of Mediated Materials	Development of Media Technology Curriculum Materials Management Center.
Phase III	Air Based Center (ABC) & Continuation of LRC	Maintaining Air Based Center Developing Mediated Instructional System	Training Village Users
Phase IV	Exploratory Development of Transition from Air Based Center to Telecommunication (ABC)	Filed Test Developed of Developed Materials further revision	Start - Computer Based Management Systems
Phase V	Full Transition to 2 ways audio and 2 ways video Satellite & Computer Based - Ground	Application of field tested Curriculum	Computer Based Management and Delivery System - Human Resource Back-up

entry level knowledges and skills of all the participants to individualize the training so that the natives can develop the video tape programs, man the machines, and gain a knowledge of the usefulness of telecommunications via TV, instructional TV, educational TV, radio and other mediated packages to be used for their own development and growth as human beings. Let us have the natives, for example, identify their own state resources for the conduct of the workshop and help them determine their own logistic requirements for the initial period of operation and assist them in identifying learning coordinators. This workshop series should be preceded by the training of key advocates who would be key village leaders who would understand what we are trying to do and would, in turn, advocate the process in their respective villages, being conscious of the need for appropriate education and training of indigenous personnel.

The training of indigenous personnel should be lacking in educational jargonese and technical terminology and we should practice what we preach... use visuals heavily, not be dependent to any great extent upon reading as a skill to further understanding but rather use media. The media itself should be used to communicate knowledge about the media. The materials to be transmitted and the content could be carried principally through excellent full-page color illustrations with short simple audio texts where written word is not preferred to support the visual message. The content of these materials should be built around Indian and Eskimo customs, practices and cultural imbeded experiences.

We recommend the creation of regional learning resource centers in Alaska for the purpose of preparing, on a practical level, communicators who will take on the task of designing and implementing information programs in support of statewide and local educational programs.

During the first two years a learning resource center in the largest village in Alaska will house a "pilot" program. At the end of that period an evaluation will be made, to measure the qualitative and quantitative results to help determine appropriate steps for the future of the network. Some of the key elements concerning the establishment of the LRC are discussed below.

3.4.1.1 Regional Surveys

Simultaneously with the development of the first learning resource center, a survey will be started in the various regions of the state in order to:

a) determine the resources required to recruit candidates for the learning center
b) determine the real and potential needs of personnel to be trained
c) establish minimum skills for effective utilization of the indigenous participants.

3.4.1.2 Learning Materials Workshop

It is the opinion of the study team that the most productive form of training in producing educational technology techniques is based on application rather than on generalizations. The first step, therefore, must be the design of a workshop with practical validation based content and participant involvement.

The workshop package for the training of the natives will enable the indigenous personnel members of the team to produce the validate learning materials of a self-instructional nature, using equipment similar to the DATAPLEX Responsive Television equipment. The workshop package, designed under Phase Two will be replicable and, based upon this initial experience, will be modified and used repeatedly in other areas of the state where we are going to establish ground-based learning resource centers as well as the one model we recommend considering — the mobile airborne learning resource center.

In order to maximize the transferability of the program, the indigenous skills of the Eskimos and Indians, facilities, and products of the local communities must be thoroughly utilized.

The outcome of this effort should be a Learning Resource Center (LRC) staffed with local personnel who will also produce, test, and validate, learning materials as well as adapt existing off-the-shelf learning materials.

a) Training

The capacitation of selected technical personnel in the principles and techniques of communication for a Learning Resource Center, in terms of planning, producing, utilizing and evaluating pertinent materials.

b) Production

The development of written, oral and visual materials which could be used as models with local "message" adjustments, by the production units in all areas of Alaska. The adaptation of off-the-shelf curriculum materials into self-instructional packages.

c) Distribution

The circulation of the prototype materials, as well as the Center's training texts and research documents, among all those concerned.

d) Follow-up

The influencing of village schools which have Learning Resource Center communication specialists to use them adequately, so as to maximize the training they will have received in the Center, improve their effectiveness, and prevent conditions in the work environment which might lead those specialists away from the field.

3.4.1.3 Site for Center and Workshop

The second task — corollary and concurrent with the first task — will be to identify the site, both for the workshop and the Learning Resource Center. This will also be correlated with development of the Learning Resource Center organizational structure using the above mentioned model as a departure point only. However, it may have to be modified due to limitations.

3.4.1.4 Operational Requirements

The next task is to determine the logistic requirements for the initial period of operation which we have already determined to be two years. We will conduct a survey at the end of the two-year period.

It is critical and important to use indigenous personnel as managers of the centers who will make significant and relevant decisions.

3.4.1.5 Budget Support Sources

The next task will be to identify equipment purchasing, and operating budget support sources. This determination should lead to the following outcome:

> An approved operating program for the first two years, including initial production objectives, staffing and organizational plan and budget program.

3.4.1.6 Delivery Systems

Plans to fill out the matrix will be needed in the follow-up phase so that there is more to work with in the next 3 to 5 years than presently is available.

The future satellites will probably be capable of delivering both one-way and two-way interactive educational components. The identification of a variety of mixes of media, courseware, and delivery systems cannot, at this time, be adequately determined.

Part of the follow-up phase study must be the determination of conditions under which conventional methods of delivery of educational materials are not adequate for places such as rural villages where there is a population of approximately 25 persons.

The follow-up must extend the planning of the present study which, due to constraints of available research data, time and resources, was not adequate along the lines specified.

3.4.1.7 Selection of Model Materials

The latter portion of the follow-up phase will be, after the primary learning resource center is set up, and the people are trained, to identify and select model materials which have both in-school and out-of-school relevance and to design with these materials, appropriate prototype models for evaluation and demonstration purposes.

3.4.1.8 Empirical System Testing

The third phase will be to use these sets of empirically based educationally mediated courseware to go into a significant management phase using the most current satellite and terrestrial based combination existing at that time as fully as possible. This may be five years from now. Our aim is to reach not only the in-school population but as much of the community out-of-school village-based population throughout the state.

3.4.2 Consortium Approach

Establishment of a consortium of agencies and educational institutions and local community leadership to provide technical resources, funding, and psychological framework of local involvement necessary for producing films, internships of indigenous personnel after workshop experience and job surfacing and retraining. The tasks involved in bringing about the consortium would concentrate on the cohesive training of the groups so that they will establish working relationships with each other, analyze their material capabilities and determine the availability and procurement of the commitments of business and industry toward this end.

3.4.3 Mobile Airborne Learning Resource Center

Traditionally, the airplane creates a positive image in the everyday functions of the villages with air transportation of supplies, mail, medical assistance, and travel. Therefore, it is psychologically an ideal vehicle to introduce the capabilities of education technology. While the Airborne Center would originally be used as a demonstration training vehicle, it later would be implemented as a major delivery system in the learning resource network for including villages too small for cost/effective inclusion previously.

Capabilities should be built-in to maximize use of technology. Individualized instruction and all other instructional enriched cultural exposure programs would be more relevant to the needs. Also, an attempt should be made to:

1. diagnose handicaps, deviations, referrals
2. synthesize individual profiles of student
3. document as much relevant data as possible
4. include job training or retraining

5. improve ability to communicate
6. provide in-service training for professionals.

The facilities should include the same basic equipment as would be required in a minimum ground learning resource center.

CHAPTER IV

SURVEY OF EXISTING TELECOMMUNICATIONS FACILITIES AND PLANS FOR RURAL COMMUNITIES

4.1 INTRODUCTION

That Alaska, as a developing state confronted with unprecedented economic opportunities in the midst of most primitive and harsh environment, has desperate need of modern telecommunications is a foregone conclusion. The need for services to meet the increasing demand of business, social and health care communications is self-evident. The promise of applying telecommunications to improve the quality of education in the rural schools is equally evident. The question remains is really one that whether this and other needs be met by a separate and distinct network, or each should form part of an effective and efficient integrated statewide network. This is not a question of our primary concern in this phase of investigation. However, in examining the educational telecommunication needs in rural Alaska, it is important to explore the current facilities and plans which would have material effect upon the orderly development of an effective educational telecommunications network in Alaska.

4.1.1 The Bush Telephone Plans

We have studied the current RCA facilities and future plans for telephone services in bush areas since the ACS transaction. The information collected forms one of the inputs to our proposed services for educational needs in rural communities. The source material and other background data directly relevant to future planning effort is given in ANNEX D-3.

4.1.2 Satellite Communications

In recent years,it has been difficult to discuss telecommunications needs in Alaska without mentioning satellite communications. So many plans have been advanced by so many, consequently, it is important to evaluate dispassionately the disparity between reality and anticipations. In conversations with Alaskans of all walks of life, we noted an intense interest in the prospect of using satellites to serve Alaskan communications needs. This interest, as well as some confusion about the subject, has resulted from a great deal of publicity about satellites and the many claims about the potential of satellites to solve Alaskan communication problems.

For this reason, and because of the recent increase in activity by the FCC with regard to domestic satellite system filings, it is useful to consider the potential of various proposed satellite plans to satisfy the requirements of the Alaskan rural educational community. This survey is by no means comprehensive.

An in-depth analysis of this subject would properly be part of the next phase of this study. A summary of this survey is given in ANNEX D-1 and our findings are summarized in Section 4-2.

Within the framework of satellite communications, the Alaskan requirements of two-way voice communication among a large number of remote villages can most efficiently be met by using recently developed multiple access demand assignment (MADA) techniques. Further, simplification of these techniques is possible and could result in significant savings in ground facilities. A discussion on how MADA may be applied to Alaska is presented in ANNEX D-2.

4.1.3 Inventory of Alaska Rural Schools

We have prepared a comprehensive tabulation of all key variables pertaining to the design and implementation of an effective educational telecommunications network serving the rural communities in Alaska. These tables are given in ANNEX D-5, and offer the following data for each village:

a) total population
b) native population
c) electric power availability and distribution system
d) housing situation
e) school classification and enrollment
f) regional grouping
g) Permafrost condition
h) air transportation facilities
i) air distance from village to district center
j) linguistic classification
k) bush telephone facilities

The information on distance (item i) is necessary to establish a desirable configuration of the communication network pertaining to each district. Distance must be supplemented by other data on the geographical characteristics of each region in order to allow for the design of a reliable system. As a general rule, for distances below 100 miles, an HF system can be designed based on ground wave propagation that will give satisfactory service in most cases. For longer distances, a detailed study of ionospheric propagation, best frequencies, antenna characteristics plus radiated power will have to be undertaken to insure satisfactory service during days, seasons and years.

4.2 POTENTIAL OF PROPOSED SATELLITE PLANS TO SATISFY ALASKAN EDUCATIONAL REQUIREMENTS

The plans and proposals which were reviewed included the filings of eight domestic satellite system applicants, a study performed by NASA and a discussion of the applicability of Canadian satellites.

Each applicant for a domestic satellite system was requested by the FCC to state whether its system would be capable of providing service to Alaska and

Hawaii. The responses indicate that all of the proposed satellite systems are capable of providing some service to Alaska, although the type and amount of service available varies widely. Furthermore, the amount of service actually included in the basic applications is minimal or non-existent. Some applicants propose to provide earth stations to augment existing terrestrial interstate and intra-state connections. Most of the applicants, understandably concentrated just on the areas where the anticipated market demand makes the proffered services self-supporting. Proposals to serve the marginal or sub-marginal areas of the commercial market are usually qualified in some way. Finally, service to the small, isolated rural communities of Alaska are often discussed in terms of technical feasibility, but no one is yet prepared to offer a detailed, unqualified proposal to implement such plans.

Four of the eight applications go into some depth concerning the provision of services to Alaska. Two of those applicants, Comsat and RCA, applied for earth stations in Alaska. Two others, Fairchild and MCI Lockheed, proposed large, high power satellites capable of operating with small, relatively inexpensive ground terminals and have offered space segment capability to provide Alaskan service.

4.2.1 Comsat

The Comsat application makes a firm commitment to construct three earth stations, two (at Juneau and Prudhoe Bay) for interstate and intra-state commercial communications and a third to receive network television from the lower 48. In addition, Comsat proposes a comprehensive plan for a system of earth stations to serve both interstate and intra-state traffic requirements. This plan, which Comsat would impelement if approved by the Alaskan Public Utilities Commission and the FCC, would augment and improve existing communications but, other than providing a TV receiving capability in the major cities and villages, would not significantly improve the plight of the majority of the remote, isolated bush communities. Finally, Comsat discusses the technical feasibility of a plan to provide remote communities with video, radio and two-way telephone communications, using 16 foot ground terminals costing between $40,000 and $100,000. Comsat expresses a willingness to participate in a joint planning effort with interested parties who wish to work out the technical and financial problems of providing services which, while necessary and desirable, are not likely to be self-supporting.

4.2.2 RCA

The RCA application resembles Comsat's in that RCA proposes to construct five earth stations in the large cities and at Prudhoe Bay, in order to supplement the intra-state network and to augment interstate communications. This phase of the RCA plan would not have any direct impact on communications to the remote bush communities, although it would increase the quality of communications and somewhat improve access for some of those rural communities already linked to the backbone telecommunications system.

RCA further proposes, subject to commitments by the civil and military agencies of the U. S. Government to provide the necessary revenues to support it, to add nine additional earth stations to the overall system. As with the Comsat proposal, the effect of those stations would be to improve the intra-state backbone communications, augment interstate access and more TV available to the major cities. It would do little for the bush communities.

RCA proposes to offer ITV services utilizing the 2.56Hz downlink band, provided that a sufficient market for such services can be developed. This capability would not be available in the first operational satellites planned by RCA. Nor does RCA propose to provide the earth stations for those services. Charges for these ITV services are not yet specified by RCA, although it would negotiate to provide them.

4.2.3 Fairchild

Fairchild offers to provide free ITV channels in the 2.5GHz band, as well as free space segment for a random access, single voice channel per carrier system to provide telephone service to remote bush communities. These services would operate with small (7-12 foot) terminals costing between $2,000 and $25,000, depending on the location and the type of service. Fairchild does not propose to furnish these terminals.

The Fairchild application is based on the use of a large multi-purpose satellite capable of supporting high power transponders with large satellite antennas. Special transponders of a new type would have to be developed to implement the thin route, demand assigned, telephone service proposed by Fairchild.

It should be noted that the Fairchild offer of these services was contingent on the acceptance of the entire proposal, including the CONUS distribution of television. Subsequently, Fairchild submitted an application for an alternative system, specifically for television distribution, using smaller satellites without the capability for the special services previously offered for Alaska. The alternative offer was made because some broadcast interests had indicated concern that a large multi-purpose satellite system might be dominated by a single common carrier.

4.2.4 MCI-Lockheed

MCI-Lockheed offers satellites with high power operating in the 12/14 GHz bands. It claims these satellites could provide service to bush communities through earth stations of reduced complexity and cost. Earth terminals for their service are estimated at $75,000, in quantity. It is envisaged that multiple access techniques would be used to allow up to 20 locations to share about 240 voice channels in a single transponder. MCI-Lockheed states that if authorized to do so it would amend its application to provide intra-state service to Alaska.

4.2.5 NASA

A report prepared by Goddard Space Flight Center, NASA, entitled "Communication Satellite Systems for Alaska," is of interest because it considers the requirements for a dedicated satellite system to provide communications for the Alaskan bush communities. It was assumed that existing and planned commercial services would provide adequate inter-city trunking within Alaska and to the lower 48 States. The objective was a minimal-cost-system providing reception of one television channel and an optional single telephone channel to each remote bush terminal.

A modified Telesat satellite, located over the Pacific to optimize Alaska coverage, operating with 15 foot bush terminals was the configuration chosen for the minimal cost system capable of serving 150 bush terminals. An annual system cost of $7.65 million was estimated (about $50,000 per year per terminal). However, it should be pointed out that the report was the result of a brief study and was based on some cost assumptions which may no longer be valid. The authors point out that it is only intended to serve as a vehicle for initial planning discussions.

4.2.6 Canadian Telesat

It has been suggested that Alaska might share the facilities of the Canadian Telesat satellite system, in order to provide low cost services to the bush communities. This was considered for the following reasons:

1) Telesat will soon be available (early 1973)
2) Telesat will probably have excess capacity available
3) Telesat is designed to provide service to the Canadian bush communities having requirements similar to those of Alaskan bush communities.

There are some political problems involved in providing Alaskan service from the Telesat system but, it is assumed that these could be resolved by the U. S. and Canadian Governments. Technically, the proposed location of the Telesat satellites would give marginally acceptable look angles from communities in Northwest Alaska. The satellite EIRP to those communities would also be below the standard for the Canadian system. From an economic viewpoint, there is a serious drawback in that it appears that antenna sizes of more than 15 feet might be needed in the bush communities.

4.2.7 Observations

It is notable that there seems to be nearly unanimous agreement that the requirements of two-way telephone communication from small, isolated communities can most economically be satisfied by using demand assignment techniques to allow a limited number of telephone channels to be shared among a large number of users, each with low-traffic requirements. Most of the proposals reviewed here have considered using analog modulation techniques. However, as discussed in ANNEX D-2, the recent developments of the SPADE system for use with the Intelsat satellites suggests that a less sophisticated system capable of serving Alaskan bush communities with two-way voice and television reception might well result in ground terminals costing $10,000 to $15,000.

Commenting on the problems of providing services to small, isolated communities in the Alaskan bush, the Comsat application says, "The technology is available at this time; however, the requirements have not been sufficiently defined to permit detailed planning." After reviewing the filings of Comsat and the other applicants, one must agree that there does not appear to be any lack of technology. Definition of some of the requirements (those of the educational community), is the purpose of this study. It is hoped that similar efforts will be made to define the communications requirements of other areas of the community (health, government, police and fire protection, etc.) so that a well-planned, integrated system will result.

A very important determinant in deciding how to provide desired communications services is the question of how they will be supported financially; whether they will be self supporting, subsidized by the taxpayer, subsidized by other users of the system or some combination of these. The answer to this question will determine what will be offered by those who propose to supply the system.

4.3 FIELD TRIP FINDINGS ON RURAL SCHOOL COMMUNICATIONS AND OTHER RELATED FACILITIES AND PROBLEMS

The trip to Alaska undertaken by the team was aimed at their familiarization with the problems existing at the rural schools that affect their performance. There were direct contacts with the district authorities, school principals and village people in the Dillingham areas.

4.3.1 Power Supply

One of our main concerns was to establish the availability of electric power at the rural schools for possible use for the electronic educational facilities that are to be installed there in the future (see ANNEX D-4, "Data Base on Existing Electric Power Facilities and Plans for Rural Alaska).

Each of the rural schools visited generates its own electricity by means of two diesel-electric units that have more than adequate capacity. The diesel-electric units are alternated on a weekly basis. Since the alternators are single-phase, no possibility exists for connecting the units in parallel for additional power. Each of the units inspected have ratings of 25 to 30 kw with the exception of Portage Creek where the units have a 70 kw capacity. Power at each school is generated at 115 volts and 60 Hz. Each week, as previously stated, the operating set is substituted by the second unit. Lubricant is changed and the unit is readied for operation in the following week. The units inspected at two locations have time-elapsed meters ($20 each) to record the operating hours. It is strongly recommended that all units be supplied with these meters to permit the basing of maintenance procedures on these readings.

The voltage regulation of the units seems satisfactory. In the event that transients affect the performance of instructional electronic equipment due to the starting and stopping of the pumps, the recommended solution will be to schedule the pumping operation at non-school hours.

The make of the diesel-electric units may differ from school to school. It would be extremely convenient from an economical and maintenance standpoint to standardize all the units for a region. This will represent an appreciable economy in space and money for the central regional depot. According to information received most of the rural schools have been supplied with the necessary power plants.

Storage rooms at each location were inspected; and it was noted that an acute shortage of shelves exists at all of them, a condition that does not allow for a neat and well-organized inventory or for quick location of the needed material.

4.3.2 Communications Facilities

With no exception, all principals and teachers underscored the importance of direct and effective communications between the rural schools and their districts. Three of the rural schools visited have HF transceivers and the principals were satisfied with their performance although stating that at times communication was difficult or noisy. All of the schools visited had poorly installed antennas which in part must account for the poor results obtained at times of deficient propagation conditions. Appreciable improvements at small expense can be obtained by: 1) using properly oriented half-wavelength dipoles, 2) using tower or masts 30 to 40 feet high to support the dipole, 3) inserting a broadband balun between the dipole and the coaxial cable (RG-8) connecting it to the transceiver. It is doubtful that all of above improvements would exceed $250 for each school.

Finally, all of the transceivers should be single-side-band, operating in the proper frequency bands. Single-sideband operation is recommended because it offers the following advantages: (1.) an effective increase of around 8 times the signal power received compared with standard AM operation, (2.) economy in frequency spectrum, (3.) better signal-to-noise ratio because of the reduced bandwidth. The proper frequencies to use for the different conditions and distances, if necessary, can be obtained from the Bureau of Standards, Colorado.

4.3.3 Observations

We are convinced that communications priorities for the Alaska educational communications system should aim at:

1. interconnections within the regions
2. interconnections from region to region
3. administrative connections between the school district headquarters and their schools

The system in operation is the one pertaining to the administrative connection by HF between the school district and the schools operating under its supervision. The existing facilities allows for the interconnections with the region up to a certain extent. All indications are that the best approach at this time is to improve the HF connections in order to allow for good immediate communications between the district superintendent and the schools, until a more sophisticated system is developed with the necessary additional facilities for adequate electronic instructions and interactive communications is made available.

CHAPTER V

A FIRST PRESCRIPTION OF EDUCATIONAL TELECOMMUNICATIONS SERVICES

5.1 INTRODUCTION

5.1.1 A Recapitulation

The purpose of this chapter is to prescribe quantitatively the telecommunications services needed initially to satisfy the educational requirements identified earlier.

In so doing, we take into account the following basic inputs derived from previous chapters:

a. Demographic projections of school-age population in bush areas.
b. Financial resources availability and major economic developments anticipated.
c. Qualitative assessment of persistent educational needs at all levels and in all regions, and the proposed programs to meet such wide spectrum of needs.
d. Probable telecommunications requirements derived from various instructional technology options.
e. Existing telecommunications and electric power plans and facilities in rural Alaska.

5.1.2 Need Categories

For the purpose of this study, the overall telecommunications requirements offered may be divided into the following three broad categories:

I. Educational Program Requirements
II. Communications Needs for Rural School Operations
III. Instructional Technology Requirements

As stated in Section 3.1, we have not completed the instructional media matrix in the first phase of this study, and consequently we cannot proceed with telecommunications service prescription along the framework as depicted in Table 3-1. Therefore, the service prescription in Section 5.4 will reflect only the needs in Categories I and II. However, the sample traffic matrix depicted in Figures 5-2, 5-3, and 5-4 do provide space for future addition of telecommunication capabilities to meet those needs derived from Category III.

The prescription of telecommunications services to meet the needs of Category I is outlined in Section 5.2 together with recommended program series which may be of higher priorities based on our interviews and conferences with the Native leaders during the field trips of the study team.

The prescription for needs of Category II is discussed in considerable detail in Sections 5.3 During the Initial Phase, a pilot program is proposed to explore the inter-school communication requirement in Fairbanks and Dillingham areas. In the Second Phase, we proceed with assumptions on future school organization, and the inter-school communications network is planned according to certain rules which reflect those needs and priorities, as uncovered by our field visits, and findings derived from the pilot program.

Finally, the consolidation of the existing requirements we have managed to identify and quantify at this stage results in our "First Prescription" of services to be offered. A set of traffic matrixes is constructed for illustrative purposes.

5.2 TELECOMMUNICATIONS REQUIREMENTS FOR EDUCATIONAL PROGRAMS

5.2.1 Vidio-Audio Programming

A list of subjects under consideration for the educational curriculum to be delivered to the Alaskan communities was presented in Chapter II, Table 2-9. An attempt is made here to sketch a tentative television-radio schedule in accordance to this array of programs.

To establish the daily requirements and circuits needed for the program, Figure 5-1 was prepared based on the following assumptions:

a. School hours start at 09:00 and end at 15:00, one hour for lunch from 12:00 to 13:00
b. One full day with no activities (tentatively Sunday)
c. From 16:00 to 20:00 (when required) for teacher and adult programming

To simplify the distribution of subjects, the schedule was prepared under the assumption that all programs are one-hour long. Most probably, some programs such as News (C-1) will take up less time, giving added flexibility for any special requirements that may arise.

All programs marked with an asterisk are bi-weekly or monthly; therefore, allowing for coverage of subjects I to N at different times.

Figure 5-1 suggests that one video channel plus the required sound channels is more than sufficient to satisfy the needs for the educational program envisioned. In the event that interactive operation becomes feasible and desirable, it will not affect, or does not seem likely to affect, the program as proposed.

5.2.2 Recommended Program Series of High Priorities

In Section 2.5 dealing with Alaska Program Needs, the study team has

FIGURE 5-1

TENTATIVE WEEKLY DISTRIBUTION OF PROGRAMS

Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
09-10	F-1	B-1	F-1	B-1	B-1	J-5	☒
10-11	D-3	D-3	D-3	D-3	D-3	J-3	☒
11-12						J-9	☒
12-13	☒	☒	☒	☒	☒	☒	☒
13-14	C-1	C-1	C-1	C-1	C-1	F-1	☒
14-15	B-2	B-2	B-2	B-2	B-2	G-1	☒
15-16	A-1	A-2				☒	☒
16-17	A-1	A-2	A-3-4	B-4	A-2	B-3	☒
17-18	A-5	A-7	A-6	A-7	A-9*	B-4	☒
18-19	B-5*	B-6-8*	B-7	C-3	B-7*	J-1*	☒
19-20	E-1	E-1	E-1	E-1	E-1	N-6	☒

A. Teachers in rural areas
B. Native culture and pride
C. News: Local, state, national and international
D. Language development
E. High School completion
F. Pre-school
G. Consumer Education
H. Leisure Time
I. Careers and jobs
J. Health and safety
K. Foods
L. Business and economics
M. Mental Health
N. Adult and parent education

*Denotes bi-weekly or monthly programs

a large number of program ideas which lend themselves to production via satellite communications on ATS-1, ATS-F, or ATS-G. We feel that these initiatives have special significance for the application of satellite communications in rural areas of Alaska. We assume that with proper transceivers it will be possible to provide satisfactory radio reception and transmission via ATS-1 but that until ATS-F and ATS-G are launched, video programs can be made available most practically through video recordings.

Native leaders will themselves need to make the final decision as to which of these program ideas most meet their needs and which should be given first, second, or third priority. However, on the basis of interviews and conferences with native leaders the study team feels the following would seem to have high priority:

1. Programs on Native culture, traditions, language which enhance self-identity.
2. News in English and Native Languages (a news service which provides objective reports not only on events normally included in broadcast news programs but also on items of special interest to the economic, social and cultural development of rural areas. Market reports on products produced in rural areas, especially the fisheries, reports on public services and facilities, educational news, news of native cultural events are examples.)
3. Programs which help the Alaska Native peoples cope with the new economy in which they find themselves, as they move from a barter to a cash economy.
4. Programs which help people understand the laws of the land—particularly giving them information about the land claims settlement and how their government works.
5. A high priority for teachers new to Alaska: a series which would provide information about the culture, life style, value system, community power structure and related teaching strategies, thus preparing them more adequately for their assignments in the village schools.
6. Key issues in the development of rural Alaska. This series should reflect the primary concerns of the Native population in such fields as education (i.e., What do you want and expect from your schools?) employment, cooperatives, health, and civic management. Programs should have wide audience appeal, be human-centered and give also samples of Native culture. The key issue of each program could be presented largely through field recordings which air the voice and views of the people themselves. They should be open-ended and provacative so that they give incentive to discussion at the receiving end. In addition to home viewing, these programs could be viewed in community centers so viewers could examine each issue in relation to their own village needs and aspirations.

7. A series for teachers on new teaching strategies and innovations in teaching. Some of these could originate from Alaska; others from the lower 48 and originate from Washington, D. C. or other locations in the lower 48. Such a series would be designed so as to keep teachers abreast of what is happening in their profession elsewhere. This would alleviate isolation and keep teachers in touch with their colleagues in the rest of the nation.

5.3 COMMUNICATIONS REQUIREMENTS FOR SCHOOL OPERATIONS

In recognition of such needs as identified in Chapter II, Section 2.4, we recommend:

a. Voice grade channel for each rural school to be in direct contact with area headquarters on a daily basis for administrative reasons.
b. Voice grade channel for each rural school to communicate at appropriate period with other rural schools confronted with a similar problem, defined as schools of same size within the same area supervision.

5.3.1 Initial Phase: Existing BIA/SOS School Systems

In the initial phase of planning and implementation, we recognize the dual BIA/SOS school systems as currently constituted in the rural area. The area administrative units for the state-operated schools are numbered 24 in total, as shown in Table 5-1, and the administrative centers for BIA schools are located in Fairbanks, Nome and Bethel, with details as depicted in Table 5-2.

The service prescription in (a) above suggests a network linking all rural schools with their respective administrative headquarters in their organizational heirarchy.

The inter-school communications links as suggested in (b) above will be given more detailed planning in the second phase as fully described below.

It is proposed that Region (19) Southwestern of the SOS school under the jurisdiction of Dillingham, and the BIA school under Fairbanks's jurisdiction be selected as the two regions for experiments concerning inter-school communications for teachers belonging to schools of roughly the same size. Such experiments in the initial phase should yield important data on operation problems, personnel training as well as our basic assumption on community of interests amongst teachers in isolated environment.

5.3.2 Second Phase: Regional Native Associations Grouping

The second phase is predicated upon the consensus that the dual school system will eventually be merged into a unified system under the jurisdiction of the seven to twelve regional native corporations, corresponding to the current regional native associations.

TABLE 5-1

ALASKA STATE-OPERATED SCHOOLS
AREA ADMINISTRATIVE UNITS

1. ADAK
   - Adak Elementary
   - Adak High
   - Atka

(700)

2. ALEUTIAN CHAIN
   - Akutan
   - Belkofski
   - Chignik
   - Chignik Lagoon
   - Chignik Lake
   - Cold Bay
   - False Pass
   - Ivanof Bay
   - Nelson Lagoon
   - Nikolski
   - Perryville
   - Port Heiden
   - Sand Point

(375)

3. BETHEL
   - Atmautluak
   - Bethel Elementary
   - Bethel High
   - Kongiganek

(1120)

4. DELTA JUNCTION
   - Delta Junction
   - Fort Greely

(410 + 320)

5. EIELSON
   - Anderson
   - Ben Eielson
   - Pennell
   - Taylor
   - Temp. Village

(2350)

6. ELMENDORF
   - Aurora
   - Middle
   - Mt. Iliamna
   - Mt. Spurr
   - Orion
   - Sunflower

(3550)

7. FORT RICHARDSON
   - Arcturus
   - J. F. Kennedy
   - URSA Major
   - URSA Minor
   - Anchorage

(2180)

8. FORT WAINWRIGHT
   - Aurora
   - Chena
   - Fairbanks Jr. High
   - McKinley

(1350)

9. FORT YUKON
   - Arctic Village
   - Birch Creek
   - Chalkyitsik
   - Circle
   - Fort Yukon
   - Stevens Village

(330)

10. GLENNALLEN
    - Chistochina
    - Copper Center
    - Gakona
    - Glennallen
    - Kenny Lake
    - Tatitlek

(490)

11. JUNEAU
    - Angoon
    - Gustvus

(170)

12. LAKE ILIAMNA
    - Igiugig
    - Kokhanok
    - Newhalen
    - Nondalton
    - Pedro Bay

(180)

13. LOWER YUKON
    - Aniak
    - Anvik
    - Chuathbaluk
    - Crooked Creek
    - Fortuna Ledge
    - Holy Cross
    - Pitka's Point
    - Red Devil
    - Russian Mission
    - Sleetemute
    - Stony River

(390)

14. McGRATH
    - McGrath
    - Nikolai

(180)

15. METLAKATLA
    - Annette
    - Metlakatla

(530)

16. NORTHWESTERN
    - Ambler
    - Buckland
    - Deering
    - Kivalina
    - Kobuk
    - Koyuk
    - Noatak
    - Noorvik
    - Point Hope
    - Selawik
    - Shishmaref
    - Sungnak
    - Teller
    - Wales
    - White Mountain

(900)

17. PRIBILOFF
    - St. George Island
    - St. Paul Island

(170)

TABLE 5-1

(cont.)

18. PRINCE OF WALES
- Bradfield Canal
- Cape Pole
- Coffman Cove
- El Capitan
- Exchange Cove
- Gildersleeve
- Port Alice
- St. John's Harbor
- Sunrise Creek
- Thorne Bay
- Thorne Island
- Tuxekan
- Whale Pass

(310)

19. SOUTHWESTERN
- Aleknagik
- Clark's Point
- Egegik
- Ekuk
- Ekwok
- Koliganek
- Levelock
- Manokotak
- New Stuyahok
- Ohgsenakale
- Pilot Point
- Platinum
- Togiak
- Twin Hills
- Dillingham

(600)

20. TANANA
- Allakaket
- Anaktuvuk Pass
- Bettles
- Galena
- Hughes
- Huslia
- Kaltag
- Koyukuk
- Manley Hot Sprs.
- Minto
- Nulato
- Rampart
- Ruby
- Tanana

(800)

21. TOK
- Dot Lake
- Eagle
- Mentasta Lake
- Northway
- Tanacross
- Tok

(360)

22. UPPER RAILBELT
- Anderson Village
- Brown's Court
- Cantwell
- Healy-Suntrana
- Tri-Valley

(270)

23. OUTSIDE
- Alcantra Youth Cp.
- Whittier

(35)

24. REGIONAL
- William E. Beltz
- Nome

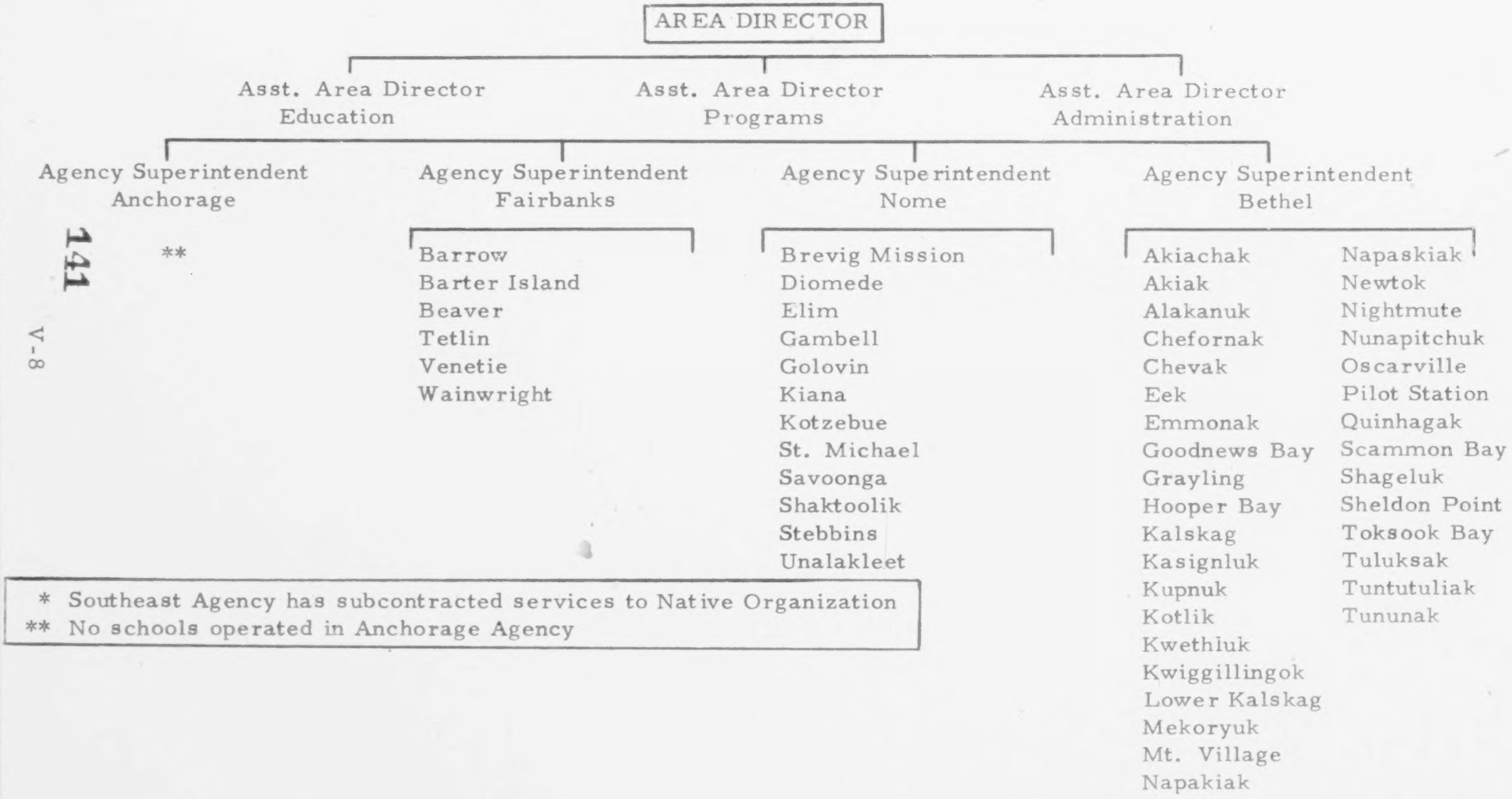
(155)

( ) Estimated Area Rural Pupil Enrollment

TABLE 5-2

BIA SCHOOL ORGANIZATION

Bureau of Indian Affairs
Juneau Area Office



- AREA DIRECTOR
  - Asst. Area Director Education
  - Asst. Area Director Programs
  - Asst. Area Director Administration
    - Agency Superintendent Anchorage
      - **
    - Agency Superintendent Fairbanks
      - Barrow
      - Barter Island
      - Beaver
      - Tetlin
      - Venetie
      - Wainwright
    - Agency Superintendent Nome
      - Brevig Mission
      - Diomede
      - Elim
      - Gambell
      - Golovin
      - Kiana
      - Kotzebue
      - St. Michael
      - Savoonga
      - Shaktoolik
      - Stebbins
      - Unalakleet
    - Agency Superintendent Bethel
      - Akiachak
      - Akiak
      - Alakanuk
      - Chefornak
      - Chevak
      - Eek
      - Emmonak
      - Goodnews Bay
      - Grayling
      - Hooper Bay
      - Kalskag
      - Kasignluk
      - Kupnuk
      - Kotlik
      - Kwethluk
      - Kwiggillingok
      - Lower Kalskag
      - Mekoryuk
      - Mt. Village
      - Napakiak
      - Napaskiak
      - Newtok
      - Nightmute
      - Nunapitchuk
      - Oscarville
      - Pilot Station
      - Quinhagak
      - Scammon Bay
      - Shageluk
      - Sheldon Point
      - Toksook Bay
      - Tuluksak
      - Tuntutuliak
      - Tununak

* Southeast Agency has subcontracted services to Native Organization
** No schools operated in Anchorage Agency

A listing of the proposed native associations and principal communities, as well as proposed regional centers is given in Table 5-3. Tables 5-4 and 5-15 give tabulations of school enrollment distribution in the 12 regions. A summary of such classification is given in Figure 5-16. A further regrouping is given in Figures 5-17 and 5-18 where eight and ultimately four is used to illustrate the incremental complexity in network transmission facilities versus the freedom and coverage with which schools of similar size can and will be given the opportunity to communicate amongst themselves.

5.4 A FIRST PRESCRIPTION OF SERVICES TO BE PROVIDED AND TRAFFIC MATRIX

5.4.1 First Service Prescription

Based on findings in the needs described in Sections 5.2 and 5.3, we offer our first prescription of services to be provided for educational purposes during the initial, say first five-year period, to be as follows:

1. Each rural school requires a capability to receive one video channel, along with a sound program in both English and one of the four Alaskan native languages.
2. Each rural school requires one phone circuit to other schools of similar size in the same area.
3. Each rural school requires one phone circuit to its area headquarters.
4. Each area administrator requires one phone circuit to his Central headquarters (either Anchorage or Juneau).

5.4.2 Traffic Matrix

The educational communications requirements are very uniform throughout the State. All schools receive one video channel plus the associated audio or radio channels of which the English and appropriate native language channels will be selected. At present it is assumed that the twelve regional administrative centers (see Table 5-3) will have video transmit and receive capability. Voice communication requirements are that all schools communicate with their regional administrative center and with all schools of the same size within the region. For this reason, schools were divided into three categories: small, medium and large, based on the enrollment. A small school is defined as one with less than 65 students. A medium school has between 65 and 250 students, and the large school has more than 250 students.

The portrayal of the traffic so quantified poses somewhat of a problem. On the one hand, the simplicity and uniformity of the educational requirements alone would not justify a computer compilation at the present time. On the other hand, a simple construction of a two-dimensional traffic matrix consisting of over 200 locations will result in a table of no modest dimensions (see a schematic diagram in Figure 5-5). Furthermore, it is premature to initiate such an effort before needs in other areas, i.e. health care, law enforcement, disaster warning, inter-governmental agency communications, etc. are quantified and integrated with those of education for Alaska.

TABLE 5-3

ALASKA NATIVE ASSOCIATIONS AND PRINCIPAL COMMUNITY

	Region	Regional Center
1.	Artic Slope Native Association	Barrow
2.	Bering Straits Association	Nome
3.	Northwest Alaska Native Association	Kotzebue
4.	Association of Village Council Presidents	Bethel
5.	Tanana Chief's Conference	Fairbanks
6.	Cook Inlet, Native Association	Anchorage
7.	Bristol Bay Native Association	Dillingham
8.	Aleut League	St. Paul
9.	Chugach Native Association	(Cordova or Valdez)
10.	Tlingit Haida Central Council	Juneau
11.	Kodiak Area Native Association	Kodiak
12.	Copper River Native Council	Glenallen

TABLE 5-4

REGION 1: ARCTIC, NORTH SLOPE ASSOCIATION

Language: Northern Eskimo

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Barrow	2400	BIA	665	L	
Anaktuvuk Pass	97	SOS	36	S	240
Cape Lisbourne					280
Deadhorse	15				170
Kaktovik	108	BIA	41	S	210
Nooiksut					140
Point Hope	369	SOS	100	M	310
Point Lay					180
Prudhoe Bay	4				200
Wainwright		BIA	105	M	85

Notes

1. School size classification: small (S) for less than 65 students; medium (M) for 65-250 students; large (L) for 250 and more students.
2. This information is necessary to establish a desirable configuration of the communications network pertaining to each region. See discussion in Section 4.1.3.

TABLE 5-5

REGION 2: BERING STRAITS ASSOCIATION

Language: Northern Eskimo

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Nome	1534	District	826	L	
Brevig Mission	118	BIA	48	S	65
Diomede	82	BIA	28	S	135
Elim	168	BIA	47	S	90
Gambell	356	BIA	91	M	195
Golovin	111	BIA	32	S	90
Koyuk	121	SOS	45	S	130
St. Michael	192	BIA	61	S	125
Savoonga	354	BIA	102	M	160
Shaktoolik	144	BIA	37	S	130
Shishmarek	249	SOS	71	M	120
Stevvins	223	BIA	61	S	120
Teller	192	SOS	58	S	55
Unalakleet	403	BIA	158	M	150
Wales	121	SOS	26	S	105
White Mountain	84	SOS	20	S	60
William E. Beltz		SOS	160	M	0

TABLE 5-6

REGION 3: NORTHWEST ALASKA NATIVE ASSOCIATION

Language: Northern Eskimo

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Kotzebue	1338	BIA	638	L	
Ambler	159	SOS	48	S	130
Buckland	103	SOS	32	S	65
Candle					110
Deering	83	SOS	26	S	55
Kiana	268	BIA	80	M	55
Kivalina	183	SOS	54	S	80
Kobuk		SOS	18	S	155
Noatak	286	SOS	75	M	55
Noorvik	443	SOS	141	M	35
Selawik	418	SOS	140	M	70
Shungnak	160	SOS	51	S	145

TABLE 5-7

REGION 4: ASSOCIATION OF VILLAGE COUNCIL PRESIDENTS

Language: South Southwestern Eskimo
and Interior Indian

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Bethel	1871	SOS	1001	L	
Akiachak	300	BIA	73	M	25
Akiak	169	BIA	37	S	35
Akolmiut	512	BIA	184	M	20
Alakanuk	247	BIA	105	M	160
Aniak	170	SOS	70	M	105
Anvik	75	SOS	25	S	145
Atmautluak		SOS	46	S	
Cape Romanzov					
Chefornak	141	BIA	43	S	80
Chevak	376	BIA	141	M	130
Chuathbaluk	90	SOS	35	S	125
Crooked Creek	55	SOS	25	S	155
Eek	167	BIA	56	S	35
Emmonak	421	BIA	134	M	160
Georgetown	0				165
Goodnews Bay	210	BIA	59	S	100
Grayling	136	BIA	46	S	175
Holy Cross	192	SOS	57	S	125
Hooper Bay	477	BIA	226	M	145
Kalskag	106	BIA	40	S	75
Kipnuk	320	BIA	111	M	85
Kongiganek	183	SOS	68	M	60
Kotlik	224	BIA	64	M	165
Kwethluk	390	BIA	112	M	25
Kwigillingok	145	BIA	56	S	65
Lime Village					230
Lower Kalskag	177	BIA	47	S	60
Makok					135

REGION 4(cont.)

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Marshall (Fortuna Ledge)	169	SOS	46	S	80
Mekoryuk	234	BIA	80	M	140
Minchumina Lake					380
Mountain Village	394	BIA	124	M	110
Mumtrak					110
Napakiak	265	BIA	69	M	10
Napaskiak	255	BIA	59	S	10
Newtok	111	BIA	45	S	90
Nightmuit	122	BIA	35	S	100
Nunapitchuk					30
Oscarville	38	BIA	11	S	10
Paradise					120
Pilot Station	287	BIA	77	M	90
Pitka's Point	67	SOS	21	S	100
Platinum	48	SOS	23	S	125
Quinhagak	332	BIA	83	M	70
Red Devil	22	SOS	22	S	160
Russian Mission	138	SOS	29	S	70
St. Mary's	350		116	M	105
Scammon Bay	166	BIA	52	S	140
Shageluk	158	BIA	35	S	140
Sheldon's Point	121	BIA	51	S	155
Sleetmute	95	SOS	38	S	165
Stony River	61	SOS	17	S	180
Toksook Bay	251	BIA	68	M	110
Tuluksak	193	BIA	49	S	30
Tuntutuliak	154	BIA	45	S	45
Tununak	270	BIA	8	S	120

TABLE 5-8

REGION 5: TANANA CHIEFS' CONFERENCE

Language: Interior Indian

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Fairbanks					
Allakaket	168	SOS	42	S	175
Anaktuvuk Pass	98	SOS	36	S	255
Anderson Village	7	SOS	87	M	70
Arctic Village	82	SOS	39	S	235
Beaver	86	BIA	32	S	110
Bettles	90	SOS	12	S	180
Birch Creek		SOS	10	S	110
Brown's Court		SOS	23	S	70
Cantwell	43	SOS	21	S	105
Central	3				110
Chalkyitsik	123	SOS	29	S	165
Circle	32	SOS	16	S	120
Delta Junction	10	SOS	389	L	80
Dot Lake	29	SOS	10	S	130
Eagle	4	SOS	17	S	190
Evansville	14				175
Fort Yukon	376	SOS	189	M	140
Galena	265	SOS	136	M	270
Healy	10		124	M	70
Hughes	73	SOS	26	S	200
Huslia	151	SOS	48	S	250
Kaltag	193	SOS	72	M	330
Koyukuk	121	SOS	48	S	295
Manley Hot Springs	11	SOS	13	S	85
McGrath	116	SOS	144	M	270
Medfra					190
Minchumina Lake					150

REGION 5 (cont.)

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Minto	159	SOS	37	S	45
Montana	4				90
Nabesna Village					220
Nenana	142	District	235	M	50
New Minto					45
Nikolai	101	SOS	27	S	230
North Pole	35				20
Northway	10	SOS	87	M	195
Nulato	298	SOS	101	M	205
Rampart	21	SOS	13	S	80
Ruby	134	SOS	48	S	225
Stevens Village	72	SOS	16	S	90
Summit	2				120
Suntrana	11				60
Tanacross	77	SOS	13	S	165
Tanana	9	SOS	174	M	130
Telida					195
Tetlin	108	BIA	25	S	195
Tok	26	SOS	195	M	180
Tri-Valley		SOS	173	M	100
Usivelli	14				50
Venetie	108	BIA	25	S	155

TABLE 5-9

REGION 6: COOK INLET NATIVE ASSOCIATION

Language: Interior Indian

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Anchorage					
Alcantra Youth Camp		SOS	18	S	30
Eklutna	23				20
English Bay	53	District	547	L	150
Homer	58	District	277	L	120
Hope	0	District	11	S	20
Houston	2				25
Kachemak	12				120
Kasilof	0				60
Kenai	175	District	1817	L	60
Moose Pass	0	District	28	S	55
Ninilchik	18	District	117	M	100
Palmer	38	District	1384	L	40
Port Graham	96	District	26	S	145
Seldovia	138	District	188	M	130
Soldotna	16	District	392	L	65
Sutton	3				55
Talkeetna	12	District	135	M	75
Tyonek	221	District	72	M	50
Wasilla	3	District	490	L	35

TABLE 5-10

REGION 7: BRISTOL BAY NATIVE ASSOCIATION

Language: SSW Eskimo
and Aleut

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Dillingham	587	District	344	L	
Aleknagik	97	SOS	39	S	10
Aleknagik North Shore		SOS	16	S	10
Clark's Point	75	SOS	24	S	15
Egegik	74	SOS	31	S	75
Ekuk	50	SOS	15	S	25
Ekwok	94	SOS	31	S	40
Igiugig	34	SOS	12	S	95
Iliamna	23				140
King Salmon	12	District	26	S	70
Kokhanok	67	SOS	28	S	145
Koliganek	134	SOS	42	S	60
Levelock	60	SOS	27	S	55
Manokotak	205	SOS	79	M	30
Naknek	38	District	211	M	60
Newhalen	83	SOS	38	S	130
New Stuyahok	208	SOS	77	M	50
Nondalton	182	SOS	73	M	140
Ohgsenakale		SOS	25	S	35
Pedro Bay	51	SOS	14	S	165
Pilot Point	58	SOS	14	S	105
Portage Creek					30
Port Heiden (Meshik)	58	SOS	22	S	140
South Naknek	85	District	48	S	60
Togiak	377	SOS	129	M	65
Twin Hills	66	SOS	25	S	60

TABLE 5-11

REGION 8: ALEUT LEAGUE

Language: Aleut

	Native Population	School	Enrollment	School Size	Distance to Regional Center
St. Paul	428	SOS	115	M	
Akutan	90	SOS	19	S	270
Atka	86	SOS	20	S	400
Belkofsky	53	SOS	16	S	390
Chignik	67	SOS	12	S	440
Chignik Lagoon	65	SOS	17	S	430
Chignik Lake	115	SOS	34	S	420
Cold Bay	32	SOS	26	S	320
False Pass	58	SOS	19	S	305
Ivanof Bay	46	SOS	17	S	410
King Cove	252	District	69	M	330
Nelson Lagoon	39	SOS	10	S	350
Nikolski	52	SOS	11	S	300
Paulof Harbor	38				340
Perryville	90	SOS	13	S	430
St. George Island	156	SOS	48	S	45
Sand Point	265	SOS	121	M	395
Squaw Harbor	52				385
Unalaska	121	District	108	M	260

TABLE 5-12

REGION 9: CHUGACH NATIVE ASSOCIATION

Language: Interior Indian

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Cordova	196	District	529	L	
Valdez	150	District	327	L	45
Chitina	6				75
Cooper Landing	1	District	18	S	135
Seward	216	District	609	L	140
Tatitlek	107	SOS	26	S	35
Whittier	5	SOS	13	S	100

TABLE 5-13

REGION 10: TLINGIT HAIDA CENTRAL COUNCIL

Language: Coastal Indian

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Juneau					
Angoon	377	SOS	124	M	60
Annette	22	SOS	131	M	250
Bradfield Canal					150
Campbell	6				210
Cape Pole	15	SOS	19	S	150
Coffman Cove		SOS	19	S	150
Craig	153	District Public	89	M	200
Edna Bay	3				160
El Capitan		SOS	16	S	150
Elfin Cove	2				70

REGION 10 (cont.)

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Gildersleeve		SOS	6	S	150
Gustavus	4	SOS	22	S	50
Haines (Port Chilkoot)	110	District	462	L	75
Hoonah	539	District	292	L	45
Hydaburg	189	District	50	S	220
Hyder	0				225
Kake	406	District	183	M	95
Kasaan	8				200
Klawock	195	District	72	M	190
Klukwan	92	BIA	20	S	90
Metlakatla	860	SOS	356	L	250
Mt. Edgecumbe	483	BIA	139	M	100
Myers Chuck	2				200
Pelican	27	District	33	S	75
Petersburg	295	District	686	L	120
Port Alexander	3				140
Port Alice		SOS	12	S	150
Port Chilkoot	52				75
St. John's Harbor		SOS	17	S	150
Saxman	99				225
Shakan Bay				S	150
Sitka	836	District	1674	L	95
Skagway	41	District	205	L	80
Tenakee Springs	10	SOS	9	S	60
Thorne Bay	7	SOS	94	S	190
Thorne Island		SOS	12	S	190
Tuxekan		SOS	9	S	150
Whale Pass		SOS	15	S	150
Wrangell	421	District	645	L	150
Yakutat	157	District	103	M	205

TABLE 5-14

REGION 11: KODIAK AREA NATIVE ASSOCIATION

Language: SSW Eskimo

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Kodiak	642	District	1107	L	
Akhiok	113		42	S	90
Karluk	95	District	20	S	75
Larsen Bay	91	District	32	S	60
Old Harbor	269	District	88	M	55
Ouzinkle	143	District	34	S	10
Port Lions	184	District	11	S	20

TABLE 5-15

REGION 12: COPPER RIVER NATIVE COUNCIL

Language: Interior Indian

	Native Population	School	Enrollment	School Size	Distance to Regional Center
Glennallen	37	SOS	315	L	
Chistochina	115	SOS	19	S	40
Copper Center	93	SOS	35	S	15
Gakona	23	SOS	26	S	20
Gulkana	52				10
Kenny Lake		SOS	80	M	
Mentasta Lake	64	SOS	17	S	80

TABLE 5-16

SCHOOL ENROLLMENT SIZE DISTRIBUTION IN 12 NATIVE ASSOCIATIONS

	Large	Medium	Small	Total
REGION 1 Arctic, North Slope Association	1	2	2	5
REGION 2 Bering Straits Association	1	5	11	17
REGION 3 Northwest Alaska Native Association	1	4	6	11
REGION 4 Association of Village Council Presidents	1	18	30	49
REGION 5 Tanana Chiefs' Conference	1	12	24	37
REGION 6 Cook Inlet Native Association	6	4	4	14
REGION 7 Bristol Bay Native Association	1	5	18	24
REGION 8 Aleut League	0	4	13	17
REGION 9 Chugach Native Association	3	0	3	6
REGION 10 Tlingit Haida Central Council	7	7	16	30
REGION 11 Kodiak Area Native Association	1	1	5	7
REGION 12 Copper River Native Council	1	1	4	6
TOTALS	24	63	136	223

TABLE 5-17

SCHOOL ENROLLMENT SIZE DISTRIBUTION IN 8 MAJOR GROUPS

	Large	Medium	Small	Total
GROUP I Arctic, North Slope Association Bering Straits Association Northwest Alaska Native Association	3	11	19	33
GROUP II Association of Village Council Presidents	1	18	30	49
GROUP III Bristol Bay Native Association	1	5	18	24
GROUP IV Aleut League	0	4	13	17
GROUP V Kodiak Area Native Association	1	1	5	7
GROUP VI Tanana Chiefs' Conference	1	12	24	37
GROUP VII Cook Inlet Native Association Chugach Native Association Copper River Native Council	10	5	11	26
GROUP VIII Tlingit Haida Central Council	7	7	16	30
		TOTAL		223

TABLE 5-18

SCHOOL ENROLLMENT SIZE DISTRIBUTION BY 4 MAJOR LINGUISTIC GROUPS

	Large	Medium	Small	Total
GROUP I Arctic, North Slope Association Bering Straits Association Northwest Alaska Native Association	3	11	19	33
GROUP II Association of Village Council Presidents Bristol Bay Native Association Aleut League Kodiak Area Native Association	3	28	66	97
GROUP III Tanana Chiefs' Conference Cook Inlet Native Association Chugach Native Association Copper River Native Council	11	17	35	63
GROUP IV Tlingit Haida Central Council	7	7	16	30
		TOTAL		223

However, for illustrative purposes, three segments of the traffic matrix were constructed using the information compiled in Tables 5-4 through 5-18. The three segments are as follows:

Figure	Regional Characteristics	Data Base
5-2	Region 1 Arctic, North Slope Association Language: Northern Eskimo	Table 5-4
5-3	Region 7 Bristol Bay Native Association Language: SSW Eskimo & Aleut	Table 5-10
5-4	Group VII of the 8 major groupings Cook Inlet Native Association Chugach Native Association Copper River Native Council Language: Interior Indian	Table 5-17

The twelve administrative regions have further been grouped according to the four main native language groupings (Table 5-18) since it is felt that inter-regional communications will be greater between regions having a common native language.

The relation of the three segments to the overall matrix comprising a total of 223 village schools is shown in Figure 5-5 where they have been shaded in. The numbers below the regional administrative centers indicate the number of communities in the region. The numbers in the boxes indicate the number of large, medium and small schools, respectively, in the region.

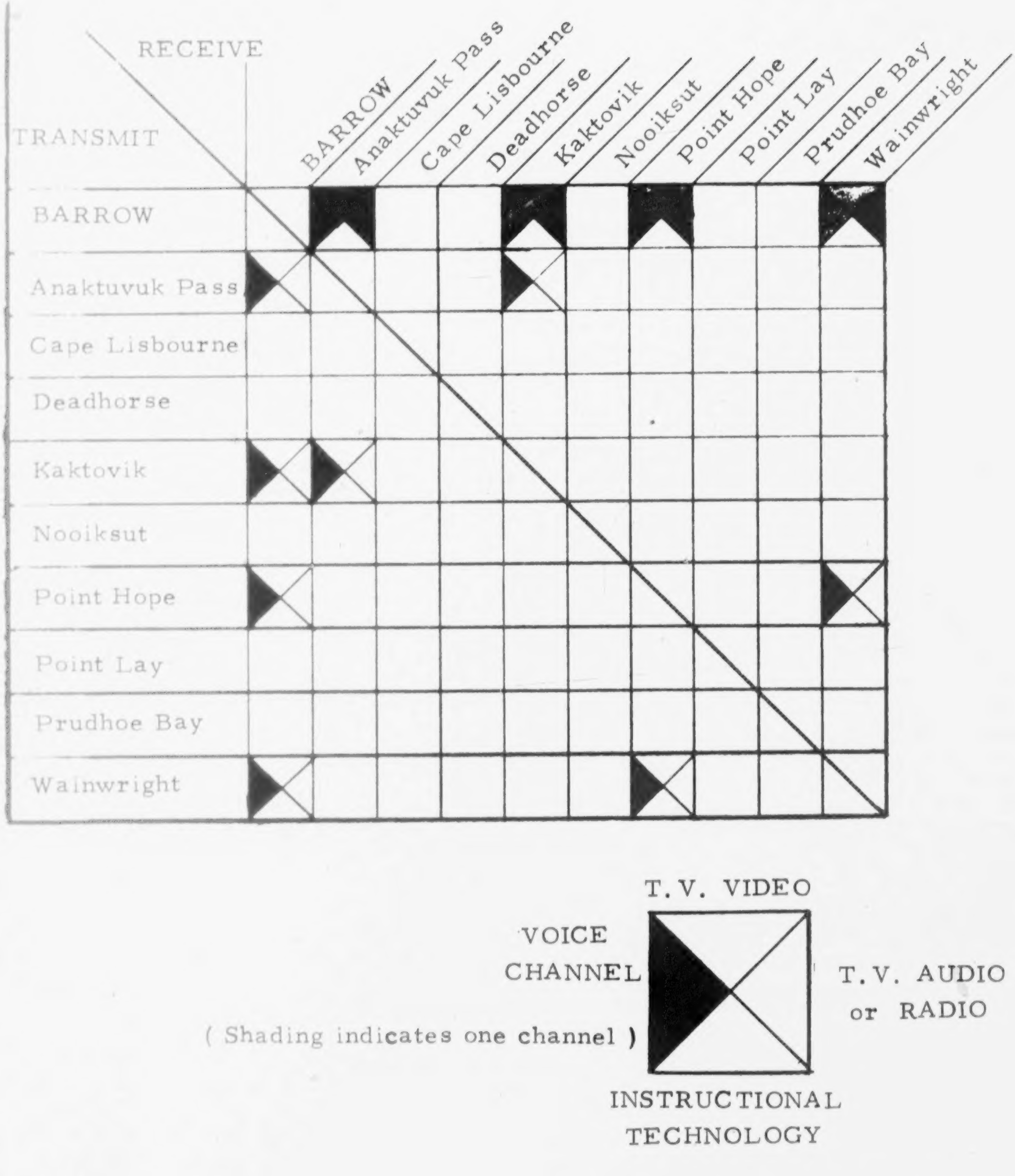

RECEIVE
TRANSMIT
BARROW
Anaktuvuk Pass
Cape Lisbourne
Deadhorse
Kaktovik
Nooiksut
Point Hope
Point Lay
Prudhoe Bay
Wainwright
T.V. VIDEO
VOICE CHANNEL
T.V. AUDIO or RADIO
(Shading indicates one channel)
INSTRUCTIONAL TECHNOLOGY

FIGURE 5-2 TRAFFIC MATRIX FOR REGION 1 - ARCTIC, NORTH SLOPE ASSOCIATION

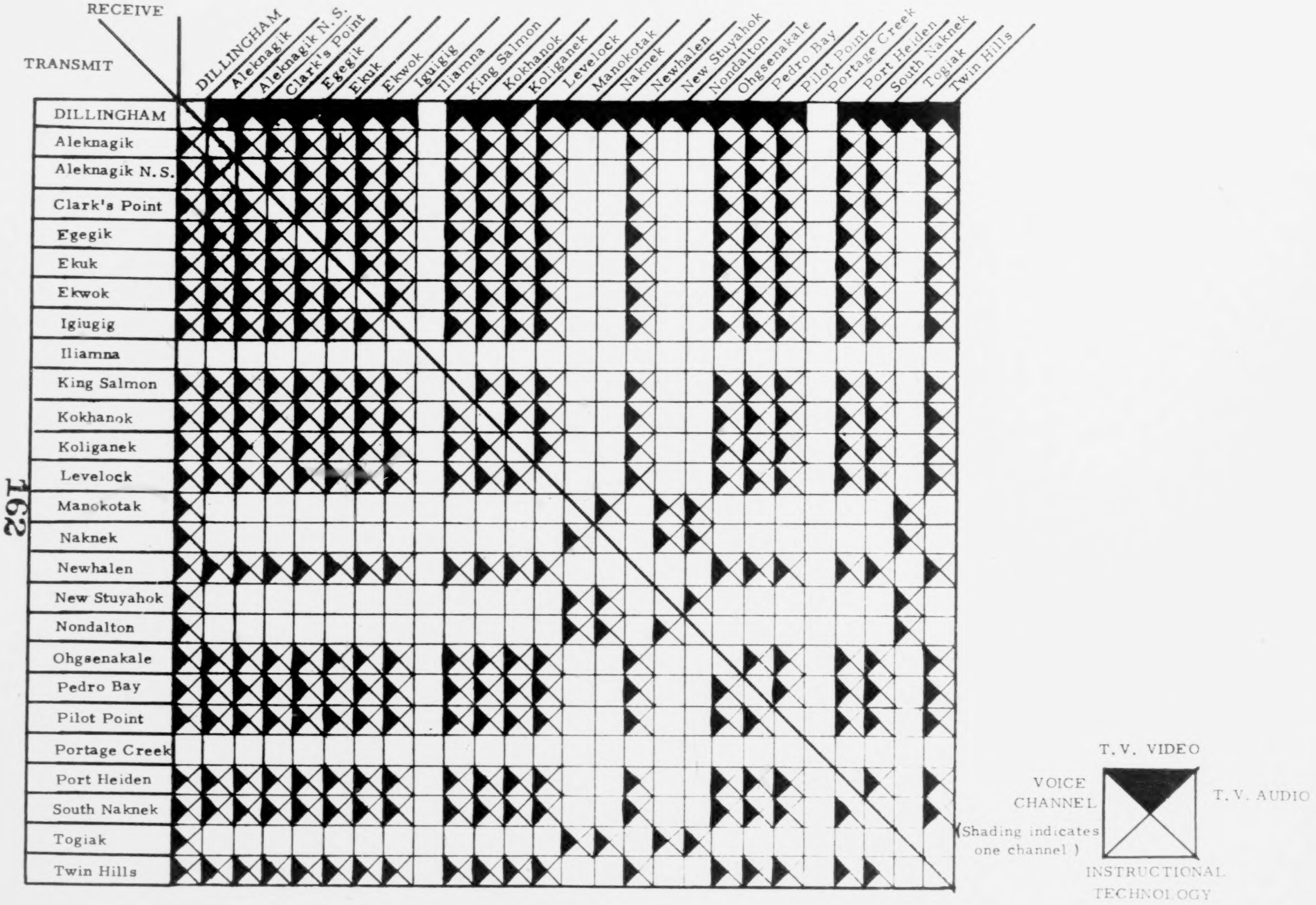

RECEIVE
TRANSMIT
DILLINGHAM
Aleknagik
Aleknagik N.S.
Clark's Point
Egegik
Ekuk
Ekwok
Igiugig
Iliamna
King Salmon
Kokhanok
Koliganek
Levelock
Manokotak
Naknek
Newhalen
New Stuyahok
Nondalton
Ohgsenakale
Pedro Bay
Pilot Point
Portage Creek
Port Heiden
South Naknek
Togiak
Twin Hills
T.V. VIDEO
VOICE CHANNEL
T.V. AUDIO
(Shading indicates one channel)
INSTRUCTIONAL TECHNOLOGY

FIGURE 5-3 TRAFFIC MATRIX FOR REGION 7 - BRISTOL BAY NATIVE ASSOCIATION

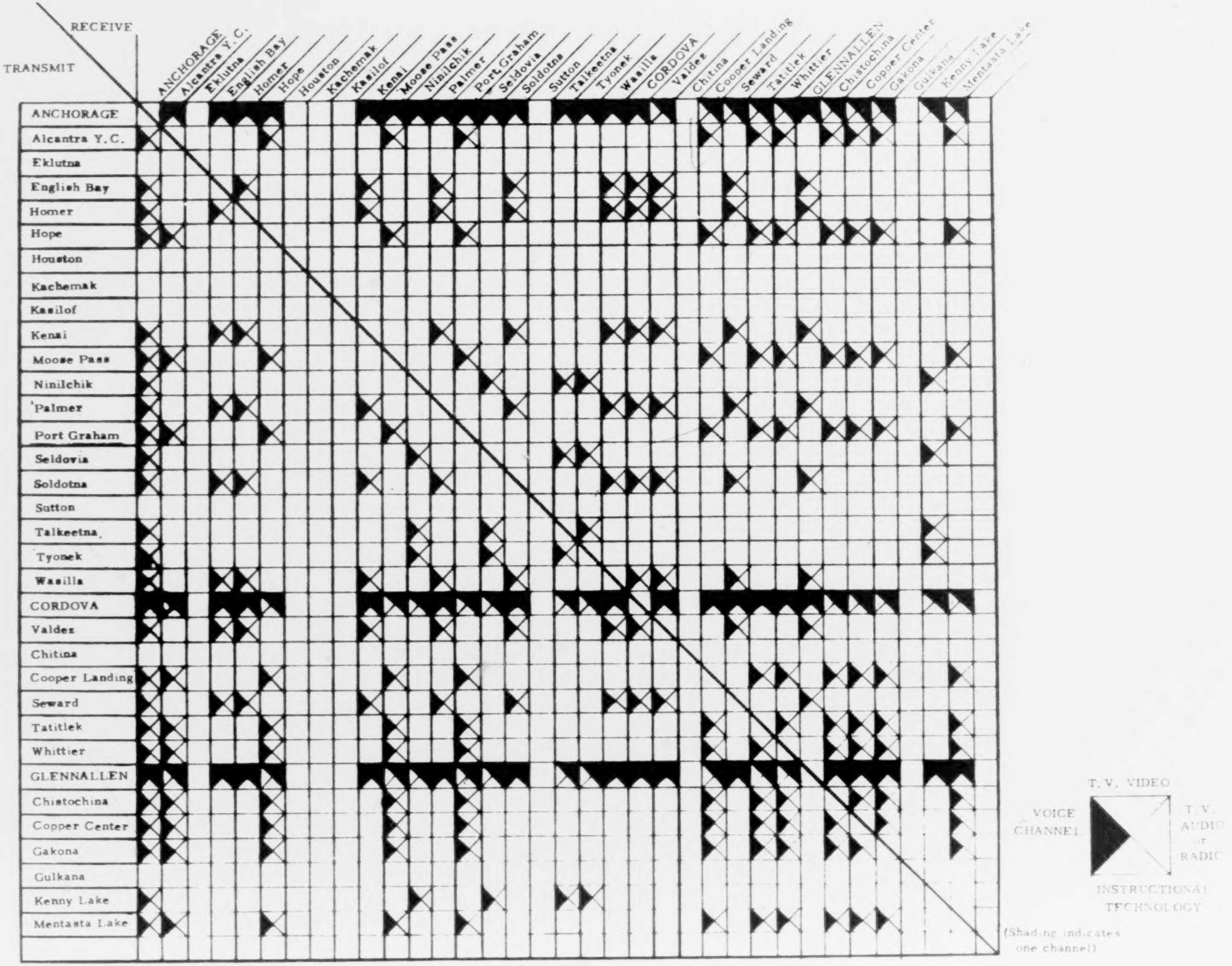
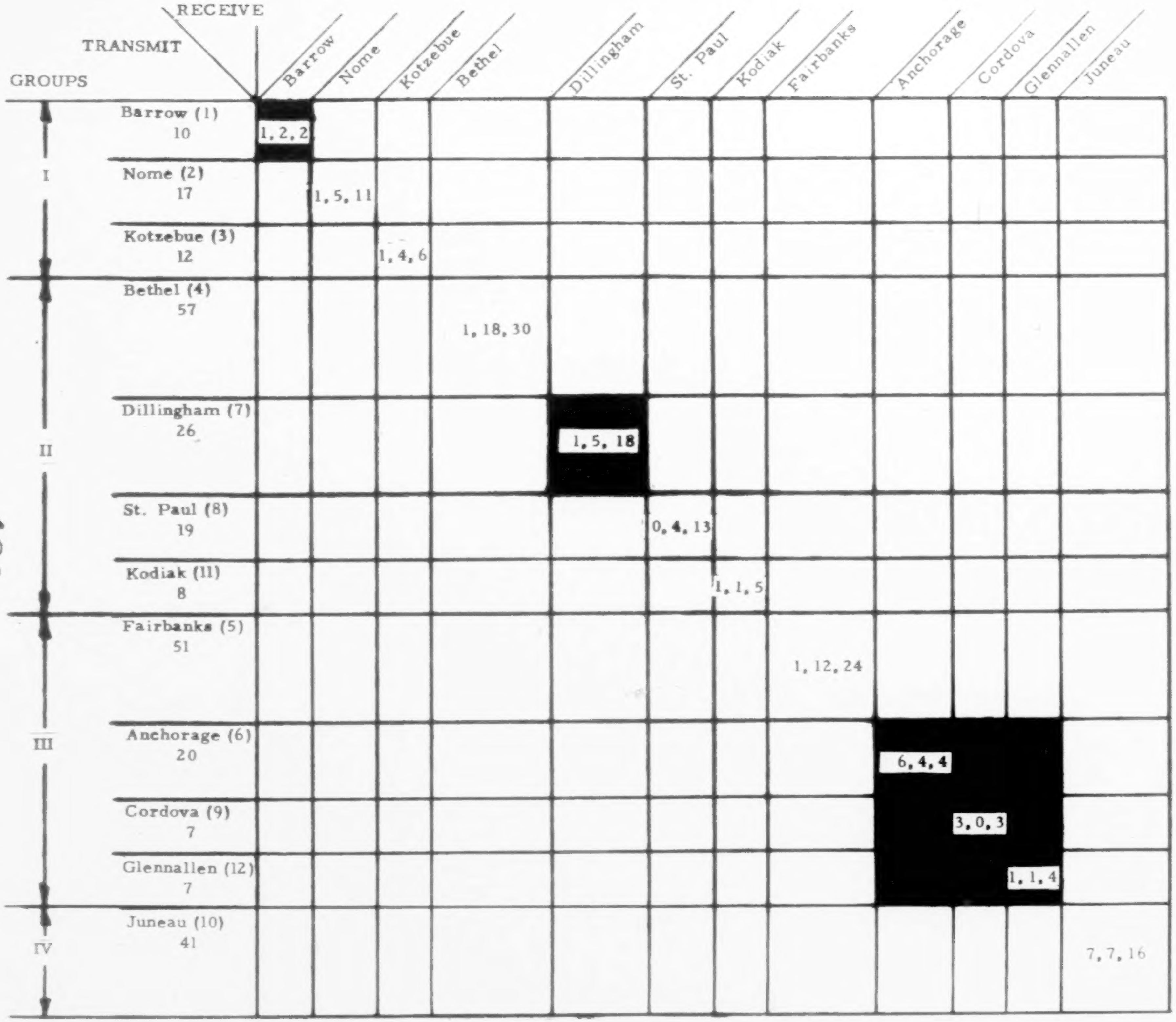

RECEIVE
TRANSMIT
ANCHORAGE
Alcantra Y. C.
Eklutna
English Bay
Homer
Hope
Houston
Kachemak
Kasilof
Kenai
Moose Pass
Ninilchik
Palmer
Port Graham
Seldovia
Soldotna
Sutton
Talkeetna
Tyonek
Wasilla
CORDOVA
Valdez
Chitina
Cooper Landing
Seward
Tatitlek
Whittier
GLENNALLEN
Chistochina
Copper Center
Gakona
Gulkana
Kenny Lake
Mentasta Lake
T. V. VIDEO
VOICE CHANNEL
T. V. AUDIO or RADIO
INSTRUCTIONAL TECHNOLOGY
(Shading indicates one channel)

FIGURE 5-4 TRAFFIC MATRIX FOR COOK INLET, CHUGACH AND COPPER RIVER NATIVE GROUP


RECEIVE
TRANSMIT
GROUPS
Barrow
Nome
Kotzebue
Bethel
Dillingham
St. Paul
Kodiak
Fairbanks
Anchorage
Cordova
Glennallen
Juneau
I
II
III
IV
Barrow (1)
10
Nome (2)
17
Kotzebue (3)
12
Bethel (4)
57
Dillingham (7)
26
St. Paul (8)
19
Kodiak (11)
8
Fairbanks (5)
51
Anchorage (6)
20
Cordova (9)
7
Glennallen (12)
7
Juneau (10)
41
1, 2, 2
1, 5, 11
1, 4, 6
1, 18, 30
1, 5, 18
0, 4, 13
1, 1, 5
1, 12, 24
6, 4, 4
3, 0, 3
1, 1, 4
7, 7, 16

The numbers in boxes indicate the number of Large, Medium and Small schools in the region

Numbers in ( ) indicate Region.
Numbers below regional center show the number of communities within region.

FIGURE 5-5 A SCHEMATIC DIAGRAM OF TRAFFIC MATRIX FOR 223 VILLAGE SCHOOLS

CHAPTER VI

RECOMMENDATIONS ON SECOND PHASE WORK PROGRAM

In this chapter, we recapitulate the major tasks accomplished in the First Phase and set forth in logical sequence the major tasks to be performed in the Second Phase.

The First Phase was not designed to yield specific recommendations, such as the choice of specific instructional technology options or the selection of a particular transmission facility. However, in the course of our investigation, and especially as a consequence of our field visits to rural areas, we have arrived at certain preliminary recommendations which might be carried out concurrently with the Second Phase program regardless of the final outcome of the subsequent phase. These suggestions might be considered primarily as prerequisites to an effective and efficient introduction of any instructional technology via any type of telecommunications network to the Alaska rural areas.

In Section 6.2, we propose the creation of a Brueau of Educational Technology. We also identify and stress the needs in the area of personnel training and the establishment of community receiving centers.

In the area of instructional media, we recommend the completion of the matrix as proposed in Section 3.2. Furthermore, we also outline the specific steps to initiate and implement the Learning Resources Center (LRC) as introduced in Section 3.4. These items shall be discussed in Section 6.3.

In the area of telecommunications system engineering, we recognize the need to integrate other requirements in Alaska with the educational requirements so identified in this phase. Once the integrated traffic matrix is obtained, the logical sequence would be the cost-effective analysis of various transmission alternatives leading to the formulation of traffic routing, network configuration and economic feasibility.

6.1 THE OVERALL EFFORT IN PERSPECTIVE

6.1.1 Tasks Accomplished

The principal objective of this overall effort is to explore the potentiality as well as the technical and economic feasibility of applying various instructional and telecommunications technologies to meet the special educational needs in rural Alaska. In this phase, we have completed the following tasks:

a. Demographic projection of National school-age population in rural areas.

b. Evaluation of major economic developments which would influence resources available to finance the proposed educational telecommunications system.
c. A thorough investigation of total education requirements in rural areas.
d. Formulation of an instructional media matrix with which all current and future media resources in Alaska may be classified and evaluated.
e. A survey of all existing telecommunications and energy facilities and plans.
f. A first prescription of educational telecommunications services.

6.1.2 Proposed Second Phase Major Tasks

For the second phase, we propose the following major tasks:

a. A complete cost-effective system engineering analysis of alternatives in transmissions systems: microwave, VHF, cable, satellites, etc. leading to network configurations, routing plans, total costs and implementation plans.
b. The completion of the instructional media matrix, leading to cost effective analysis of various options and recommendations within the constraint of the delivery system proposed.
c. Organization structure planning and personnel training to insure the effective introduction of institutional technologies to rural Alaska.
d. The integration of other telecommunications requirements such as business, social, health care, law enforcement, intergovernmental agencies, etc. with the educational traffic matrix to form a statewide integrated telecommunications network.
e. An exploration of institutional constraints, such as administrative and regulatory procedures and policy implications of all feasible options.
f. Recommendation of options and implementation plans. A conceptual work flow-chart for the first and second phase is depicted in Figure 6-1. A brief discussion on some of the major tasks proposed for the second phase is given below.

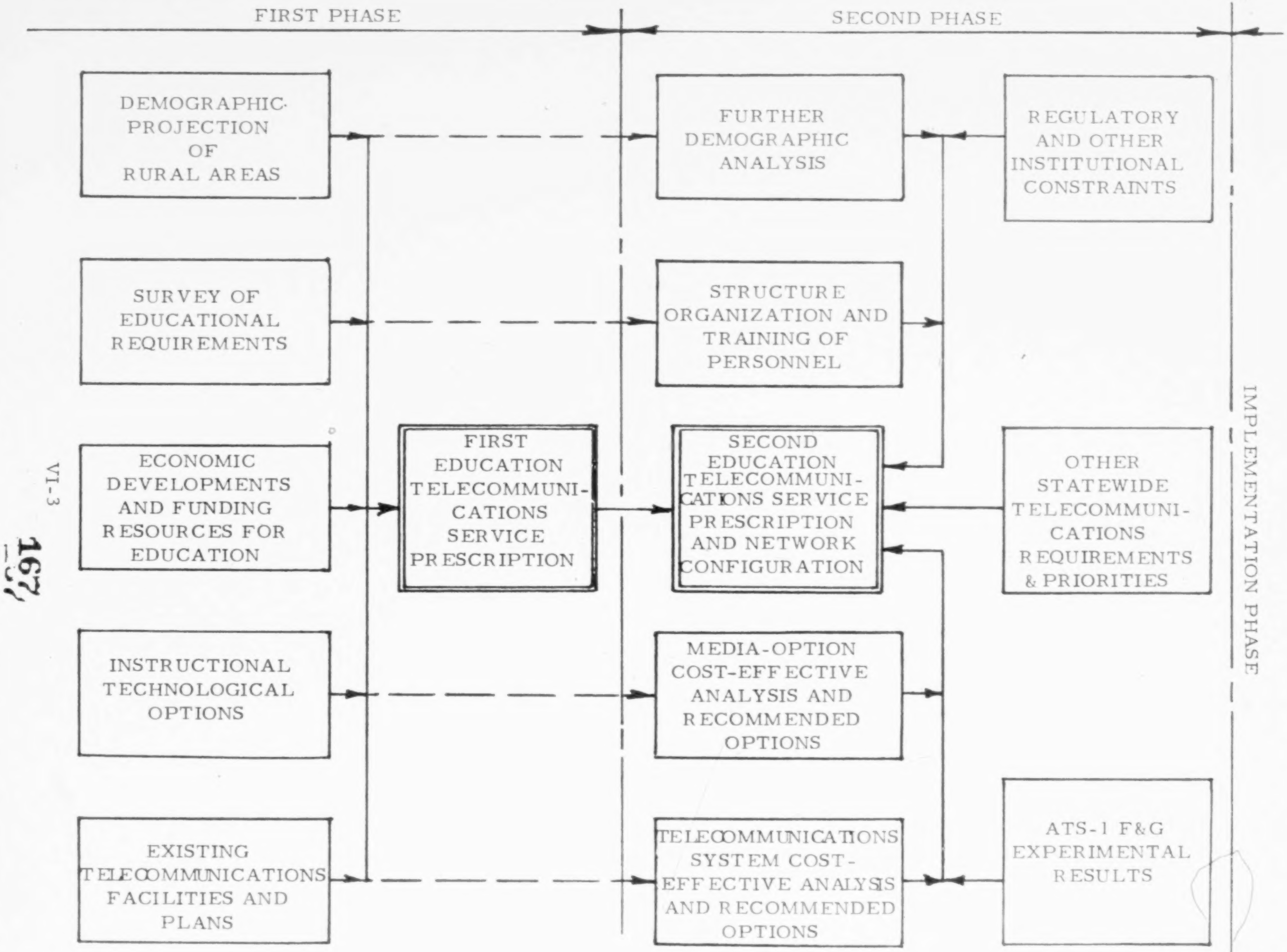
6.2 ORGANIZATION PLANNING AND PERSONNEL TRAINING

6.2.1 Creation of Bureau of Educational Technology

The Alaska State Board of Education should authorize the Commissioner of Education to create immediately within the State Department of Education a Bureau of Educational Technology which will have the following functions:

6.2.1.1 Overall Coordination

There needs to be a commitment on the part of the State to the use of


FIRST PHASE
SECOND PHASE
IMPLEMENTATION PHASE
DEMOGRAPHIC PROJECTION OF RURAL AREAS
SURVEY OF EDUCATIONAL REQUIREMENTS
ECONOMIC DEVELOPMENTS AND FUNDING RESOURCES FOR EDUCATION
INSTRUCTIONAL TECHNOLOGICAL OPTIONS
EXISTING TELECOMMUNICATIONS FACILITIES AND PLANS
FIRST EDUCATION TELECOMMUNICATIONS SERVICE PRESCRIPTION
FURTHER DEMOGRAPHIC ANALYSIS
STRUCTURE ORGANIZATION AND TRAINING OF PERSONNEL
SECOND EDUCATION TELECOMMUNICATIONS SERVICE PRESCRIPTION AND NETWORK CONFIGURATION
MEDIA-OPTION COST-EFFECTIVE ANALYSIS AND RECOMMENDED OPTIONS
TELECOMMUNICATIONS SYSTEM COST-EFFECTIVE ANALYSIS AND RECOMMENDED OPTIONS
REGULATORY AND OTHER INSTITUTIONAL CONSTRAINTS
OTHER STATEWIDE TELECOMMUNICATIONS REQUIREMENTS & PRIORITIES
ATS-1 F&G EXPERIMENTAL RESULTS

WORK FLOW CHART
Figure 6-1

educational technology as a fundamental process through which education might be improved within the State of Alaska. In the opinion of the survey team there is urgen need for coordination of all educational media activities in the schools of Alaska as soon as possible. The media programs in the State operated schools, the Bureau of Indian Affairs school, the borough and district schools should be brought together into one unified organization and program in order to effect a unified approach to the solution of problems of selection, distribution, maintenance, utilization and traning of personnel.

This coordination function should include maintaining an accurate inventory of materials and equipment available in the village schools and in all resource centers within the State. The inventory should take note of the make and model of various pieces of equipment, age, condition, and compatibility.

As the educational technology program grows, our study team urges that a field person be assigned to each of the new native corporations which are to be formed. Each of these persons could then be responsible for the planning and development of educational technology in the villages assigned to the native corporation with which he will be working. It is highly desirable that the persons assigned to these corporations be natives themselves.

6.2.1.2 Planning Activities

Across the board, short-term and long-range planning for the effective selection, distribution and utilization of media and materials throughout the state is urgently needed. Projects need to be designed to meet specific goals and objectives and developmental plan should be charted, in close cooperation with native leadership groups, which calls for a phasing in of various technology programs during the next five-ten years.

6.2.1.3 Training Activities

The staff should plan a coordinated training program for teachers, and for native personnel in each village to insure the effective utilization of technology. The study team again points out in this connection that the schools in the rural areas are unusually well-equipped with new educational media but suffer because school and village personnel do not have adequate training in the use of this technology both in teacher and in community use. In some villages audio-visual equipment is still unpacked. Training courses are needed in the villages in order to train natives themselves to produce their own materials, create their own messages and tell their own story.

6.2.1.4 Production of Materials

The Bureau of Educational Technology should be made responsible for the coordination of production activities and development software which is relevant to the needs of Alaskan schools. At least two major production centers should be created—one in Fairbanks and one in Anchorage. Smaller production sites—satellites to the major centers—might well be established also in Bethel, Barrow and Nome, particularly for the production of materials indigenous to the native villages.

6.2.1.5 Cataloging and Distribution of Materials

Village schools need to be advised of the materials which are available for their use — the sources from which the materials may be obtained and the ground rules for borrowing materials from the various centers. As quickly as possible, materials should be purchased for individual village schools so that teachers and students will have them readily available on demand. In the survey conducted by the study team, we noted that a considerable number of schools reported that they had not received any new library books in the past two or three years. One school even reported no new books during the last four years. Unquestionably, cooperation and planning are needed to rectify situations of this kind, and to insure a good balance between hardware and software as well as between print and non-print materials. A new look is also needed at the way in which materials are distributed to the various villages. Our study team found that there was great imbalance between the villages as regards the frequency of delivery of materials with very little assurance on the part of teachers that they could depend on receiving materials which they had ordered several weeks in advance.

6.2.2 Personnel Training

Concurrent to establishing a State Department of Education to undertake the above activities, the study team recommends that an immediate workshop be held preferably in the summer of 1972 to train one or two persons from each village in the operation and use of the equipment now available in the villages, so that this equipment might be used to maximum effectiveness during the 1972-73 school year. It is entirely possible that partial funding for such activity might be obtained from federal or private foundation resources. Such training is sorely needed now.

This recommendation is separate and distinct from the suggestion of regional learning resource centers. The team recognized that there are two types of training required. The proposed workshop under this recommendation is primarily addressed to the training of existing teachers and/or other school personnel for the effective utilization of existing equipments in the rural school. On the other hand, the establishment of the regional learning resource centers as further discussed in Section 6.3 is primarily designed for the training and involvement of the natives with the production and distribution of various instructional technologies.

As Alaska looks forward to the expanding application of satellite technology in schools and communities, we urge that considerable attention be given to the training of all personnel who are to be involved in any of the proposed experiments. The value and justification not only of satellite communications but of every other form of educational technology in Alaska will depend upon the quality, originality and imagination of the staff who is responsible for it. Facilities, funds, and time for training must therefore be considered a vital necessity. A training program should be set up which calls on the best talent in the rest of the nation and also elsewhere. Since conditions in Alaska are different from those in the rest of the nation, and since satellite communication to rural areas is a novel effort of significance far beyond the borders of Alaska or the United States, it would be helpful if specialists from other countries who have had particular experience in such training could be brought to Alaska for short periods during the initial phase to lend their expertise to the solution of Alaska's unique communications requirements.

While the training of production personnel and technologists is of prime importance, equally important is the training of users — teachers, health workers, community leaders and others who will be at the receiving end of the undertaking. Such training is not only concerned with the technical manipulation of the equipment, but with the pedagogical use of the media, the handling of follow-up work and discussion, and the evaluation of the impact the program series has on its intended audience. All such personnel should be trained for this purpose, both initially and continuously. Needed also are individuals who can serve as field workers in training village personnel organizing viewing groups and conducting evaluation activities in the villages. It is important to know what happens at the receiving end of the line.

6.2.3 Community Receiving Centers

However good and relevant the programs are to the audience, however widespread their dissemination through satellites or other means, their impact on the rural community or school audience depends a great deal on the way they are received. In Eskimo homes, as elsewhere, people are in the habit of keeping the radio on all the time as a sort of background noise. Rarely do they have the patience and concentration to listen attentively to an individual program. Yet, research shows that people retain far better what they have read or heard when they can talk about it, evaluate it critically and examine its meaning to their own family. Community reception of programs is not only an economic asset where the purchase of TV sets is too expensive for individual purchase, but its real importance lies in the greater concentration with which the audience follows what they hear and see on the TV screen in the stimulation of community discussion which may lead to community action. This has been the experience over the past decade in several nations, notably the Canadian Radio Farm Forum whose adaptation has made its impact in many countries of Asia and Africa, and by the Teleclubs of France and Japan which have also proven their value in less developed countries. Careful studies undertaken by Unesco document the role which community reception plays in the effectiveness of broadcast media to promote change of awareness, attitudes and practice. The study team, therefore, strongly recommends that community viewing groups be established in as many villages as possible. This becomes a necessity with the advent of ATS-F and ATS-G where individual home reception will not be possible except when interconnected with the local CATV system.

Suitable provisions should be made for community reception facilities in each village. In most villages, the school can easily become the community viewing center. In Barrow, for example, either the school instructional media center or the school gymnasium would be ideal for community viewing by large groups. In some communities, however, where the school facilities are not as adequate, the community hall or church community hall or auditorium could serve this purpose. In any event, provision for feedback to the originating point from the community viewing center enhances general interest and makes the TV presentation relevant to the local situation.

6.3 IMPLEMENTATION PLANS FOR THE REGIONAL LEARNING RESOURCE CENTERS

6.3.1 Phase One

Preliminary to the initiation of Phase One activities and tasks should be the development of a representative team consisting of community at large, consisting of (a) service agencies, (b) local school district, (c) 5 school system interface, and (d) state board of education.

The initial activity of the Phase One team will be directed at the production of a conceptual design of the Learning Resources Center (LRC). The tasks under this heading will be directed at the production of a set of policies and principles that will be consistent with the goals and objectives of the establishment of an Alaskan educational communication network. These tasks may be described as follows:

1.0 Development of the conceptual design of LRC
    1.1 Statement of goals and objectives
    1.2 Establishment of areas of subject matter coverage
    1.3 Establishment of levels of service of the center
    1.4 Establishment of proposed scope or range of LRC capacity
    1.5 Specifications of research objectives.

It will be upon the basis of the conceptual-functional design produced by the tasks above that the next tasks can be accomplished. The involvement of the team, expanded to include the necessary design engineers in the appropriate technical areas, will be intensified, and the tasks 2.0 - 8.0 below will progress concurrently whenever possible.

2.0 Development of LRC operational plan
3.0 Development of LRC architectural and engineering documentation
4.0 Development of LRC equipment specifications and layouts
5.0 Development of community, school district and the LRC staff orientation seminar plan
6.0 Development of inventory of LRC educational materials - software
7.0 Specification of research and evaluation criteria
8.0 Establishment and conduct of a community involved orientation program including project information to students, faculty, administration, all school systems, all public service agencies, the state board of education, and the public.

6.3.2 Phase Two

The termination of Phase One and the beginning of Phase Two mark the transition from modeling with plans and paper specifications to modeling on a real time and being basis. The activities of Phase Two can be started before the onset of construction of the building, and the full equipping of the LRC by the use of media simulation to test and evaluate curriculum design and procedures for the management of students and resources. The evaluation will continue even after the LRC is completed and fully operational. It is reasonable to expect that technological change as well as the research program of the LRC will generate a need for modification and adjustment. Some activities which seem relevant in advance of the completion of task 1.0 of Phase One are:

1.0 Exercise of carrel centered instruction in a sample of subject matter areas at several levels.
2.0 Exercise of carrel - community and classroom combination of instruction in a sample of subject matter areas at several levels.
3.0 Study of the resource requirements for local team generation of self-instructional courses as well as off-the-shelf modifications.
4.0 Refinement of research and evaluation programs.
5.0 Exercise and application of LRC programs.

The fundamental goals of an educational communication network directed at the learner, so the basic measure of the effectiveness of the LRC must be in terms of its value in the increments of learning. The operation of the LRC should be on a cost/benefit basis and so it is necessary to address the problem of benefit or value in menu of learning offered. Learner teams and the options they elect are thus of prime importance in assessing the ongoing operation of the LRC. At this point in the project it is sufficient to relate the relevant questions:

1.0 What are the most effective techniques for establishing a balanced adjustment to student-centered goals?
2.0 How can the LRC operation best serve the educational needs of the community?
3.0 What roles should the LRC play in the generation of fuse research?
4.0 How can the LRC avoid obsolescence and procrustean decadence?
5.0 How can the LRC serve the felt needs of the faculty?
6.0 How can the LRC serve the felt needs of the public service agencies?

6.4 TELECOMMUNICATIONS SYSTEM ENGINEERING

6.4.1 Integrated Traffic Matrix

Although the subject of this study is the delivery of appropriate instructional technology to the remote, rural communities of Alaska via a telecommunications network, it is recognized that it is neither likely nor desirable that a telecommunications system be designed solely for the satisfaction of educational requirements.

There are many other vital areas of community life which urgently require telecommunication facilities. A multi-purpose network capable of serving all of these areas would not only be more efficient as a result of economies of scale but would enable available resources (financial and other) from all areas to be concentrated on the support of the integrated system.

Areas in which telecommunication requirements should be surveyed for possible inclusion in an integrated multi-purpose network serving rural Alaska are:

a. Health-medical and hospital services, public health care, etc.
b. Public safety - law enforcement, fire, rescue, weather, etc.
c. Government - state, regional and local agencies.

In each case, there should be an attempt to determine the types of channels (i.e., teletype, voice, video) required between each pair of destinations, and the frequency with which each channel will be used, the duration of each use and the priority of access to the channel.

The data obtained for all of these areas should be combined with the educational requirements, in order to form an integrated traffic matrix. From the combined traffic requirements, the number and type of communication channels between different destinations can be determined. It will undoubtedly be useful to attempt to make these forecasts for different time frames (immediate, 5 years later, 10 years later) in order to try to estimate the growth pattern for the network. Although the forecasts for 5 and 10 years ahead may not be very accurate, they will help to establish trends and to achieve a flexible design capable of orderly and economic expansion.

6.4.2 Transmission Alternatives and Network Configuration

When the point-to-point requirements have been established for each time frame, it will be necessary to establish a routing plan to determine the best means of establishing the required channels. The applicability of existing and planned facilities must be considered in deciding on a recommended configuration capable of satisfying all the requirements.

Having established a preliminary routing plan, a series of system trade-offs must be performed in order to find a least-cost solution. Trade-off studies to be performed will consider the costs of acquisition, operation and maintenance of communication systems composed of the following:

a. Microwave
b. VHF
c. Cable
d. Satellite
    —Space Segment
    —Ground Segment

Finally, the network configuration, traffic cross-section and composition (mix of microwave, VHF, satellite and cable) will be determined. The final design must take into account the overall requirements in the different time frames. The result of this phase of the program should be a complete network description. which can be specified for implementation in a succeeding phase of the project.

6.4.3 Application of Multiple Access Demand Assignment (MADA) Techniques to Alaska

A study of the application of MADA techniques should be an integral part of the second phase. The savings which might be effected from the use of digital techniques and a central control system should be investigated.

The major objectives of the study should be:

a. Development of a delta-modulation code for use in a small bush terminal
b. Determination of the type of centralized control best suited to the requirements of remote rural communities in Alaska

A demonstration of the application of MADA techniques should be planned in conjunction with the development efforts recommended above. The demonstration should be conducted among a limited number of villages with small ground terminals using ATS-F/G satellites.

Part 2

SUPPORTING DATA

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PART TWO

SUPPORTING DATA

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ANNEX A-1

ALASKA'S POPULATION AND ECONOMY

The following material from Tussing, Rogers and Fischer, Alaska Pipeline Report, is provided as a general description of Alaska's population and economy, and as a background to the population analysis contained in this study.

Population and Workforce

In the past two decades, Alaska's population has grown substantially faster than the national average. The annual rate of population growth between 1950 and 1960 was 4.8 percent, and from 1960 to 1970 it was 3.3 percent; in addition, the growth rate fluctuated sharply within these periods. Natural increase in the resident population accounts for 71 percent of the net change over the entire 20 year period. Natural increase rates have been high because the Native as well as the non-Native Alaska populations have age profiles heavily biased towards childbearing ages and have relatively high birth rates.

While natural increase has dominated over the long term, migration has determined the year-to-year changes in number of people. For example, in 1952, net immigration equalled 16 percent of the state's total population, and in 1958, net emigration was equal to almost one-tenth of the total. The results of this high rate of turnover are exceptional: the *1960 Census of Population: Migration Between State Economic Areas* showed that 46.6 percent of the 1960 population of Alaska had not resided in Alaska in 1955. Also, the 1960 Census revealed that 31.4 percent of Alaska's 1955 population lived outside the state at the time of the 1960 Census. This contrasts with the 1960 Census results for the United States as a whole, in which only 13.0 percent of the population had moved from state to state in the five year period.

Although the extreme fluctuations in population movements of the 1950's did not continue in the 1960's, Figure II-1 suggests that net migration to and from Alaska over the 20 year period has corresponded closely with varying levels of employment in the Department of Defense, both military and civilian, and of employment in contract construction, predominantly federal projects. Since 1967-68, the oil and gas industry has significantly affected employment levels and has joined government as a major determinant of population change.

Table II-1 shows several of the distinctive characteristics of Alaska's population, workforce, and employment. Among these are exceptionally high labor force participation rates, reflecting an age-sex mix of the population favoring economically active components.* Other notable features are chronically high unemployment rates and a high proportion of government employment.

Sources of Income

Personal income for the State of Alaska in 1970 was estimated at $1,400 million or .18 percent of the national total.† Thus, Alaska's economy is roughly one-fifth of one percent as large as the national economy.

In the 11 year interval between 1959 and 1970, Alaska personal income increased from $555 million to $1,400 million, an increase of 152 percent, at an annual rate of 8.8 percent. The corresponding increase for the U.S. as a whole was 110 percent, at an annual rate of 6.9 percent.

Federal government activities have been the biggest contributor to Alaska's economy every year since statehood. Federal outlays in 1970 were still more than half of the state's economic base. The rate of growth in Alaska personal income has been accelerating, reflecting in part an accelerating growth of federal spending. Alaska personal income grew about 3 percent per year in 1960-63, 9 percent in 1963-66, and 12 percent in 1966-70. The federal government's direct contribution to personal income increased at about 1 percent per year in 1960-63, 6 percent in 1963-66, and 10 percent in 1966-70.

The growth of the oil and gas industry in the state has had a substantial impact on the state's economy since the mid-1960's. However, in 1970 the direct contribution to Alaska personal income from military payrolls was more than four times that from the petroleum industry wages and salaries. The absolute increase in military

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*The high overall labor force participation rate prevails despite very low rates for rural Natives, as indicated in the figures for southwest Alaska

†The 1970 Census gave Alaska a population of 302,173, or .15 percent of the national population. The Alaska personal income per capita of $4,590 should not be compared with the national figure of $3,919 to imply that per capita material welfare in Alaska is superior to the national average. The 17 percent per capita income differential in favor of Alaska is certainly less than the cost of living differential, however measured. See section on Prices and Costs.

TABLE II-1

WORKFORCE CHARACTERISTICS–1961 AND 1970

	CALENDAR YEAR 1961					CALENDAR YEAR 1970				
	Total State	South east	South central	South west	North ern	Total State	South east	South central	South west	North ern
					(thousands of persons)					
Total Population (July 1)	236.7	37.4	122.4	16.1	60.8	304.6	43.3	173.0	18.4	69.9
Total Workforce (includes military personnel)	108.0	16.2	59.7	3.8	28.2	148.5	21.2	87.5	5.4	34.4
Rate of Labor Force Participation	*45.6%*	*43.3%*	*48.8%*	*23.6%*	*46.4%*	*48.7%*	*49.0%*	*50.5%*	*29.3%*	*49.2%*
Total Civilian Workforce	75.5	15.6	40.2	2.9	16.7	116.8	20.6	67.5	4.4	24.4
Total unemployment	7.5	1.7	3.2	0.5	2.0	12.0	1.6	6.5	1.0	2.9
Unemployed Civilian Workforce	*9.9%*	*10.9%*	*8.0%*	*17.2%*	*12.0%*	*10.3%*	*8.0%*	*9.7%*	*21.7%*	*11.7%*
Total Employed Civilian Workforce	68.0	13.9	37.0	2.4	14.7	104.9	18.9	61.0	3.4	21.6
Self-employed, agricultural, etc.	10.9	1.9	6.2	0.6	2.2	12.4	2.2	7.8	0.4	2.0
Wage and Salary, Non-agricultural	57.1	12.0	30.8	1.8	12.5	92.5	16.7	53.2	3.1	19.6
Government (civilian)	23.8	4.6	13.8	0.6	4.8	35.6	6.9	19.3	1.3	8.1
Commodity producing[a]	10.6	3.0	4.8	0.7	2.1	17.7	4.2	9.2	1.0	3.3
Distributive[b]	22.7	4.4	12.2	0.5	5.6	39.2	5.6	24.7	0.8	8.2
					(Percentage of Total Employed Civilian Workforce)					
Wage and Salary, Non-agricultural	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*
Government (civilian)	*42*	*38*	*45*	*33*	*38*	*38*	*41*	*36*	*42*	*41*
Commodity producing[a]	*19*	*25*	*16*	*39*	*17*	*19*	*25*	*17*	*32*	*17*
Distributive[b]	*40*	*37*	*40*	*28*	*45*	*42*	*34*	*46*	*26*	*42*

[a] Mining, contract construction, manufacturing.

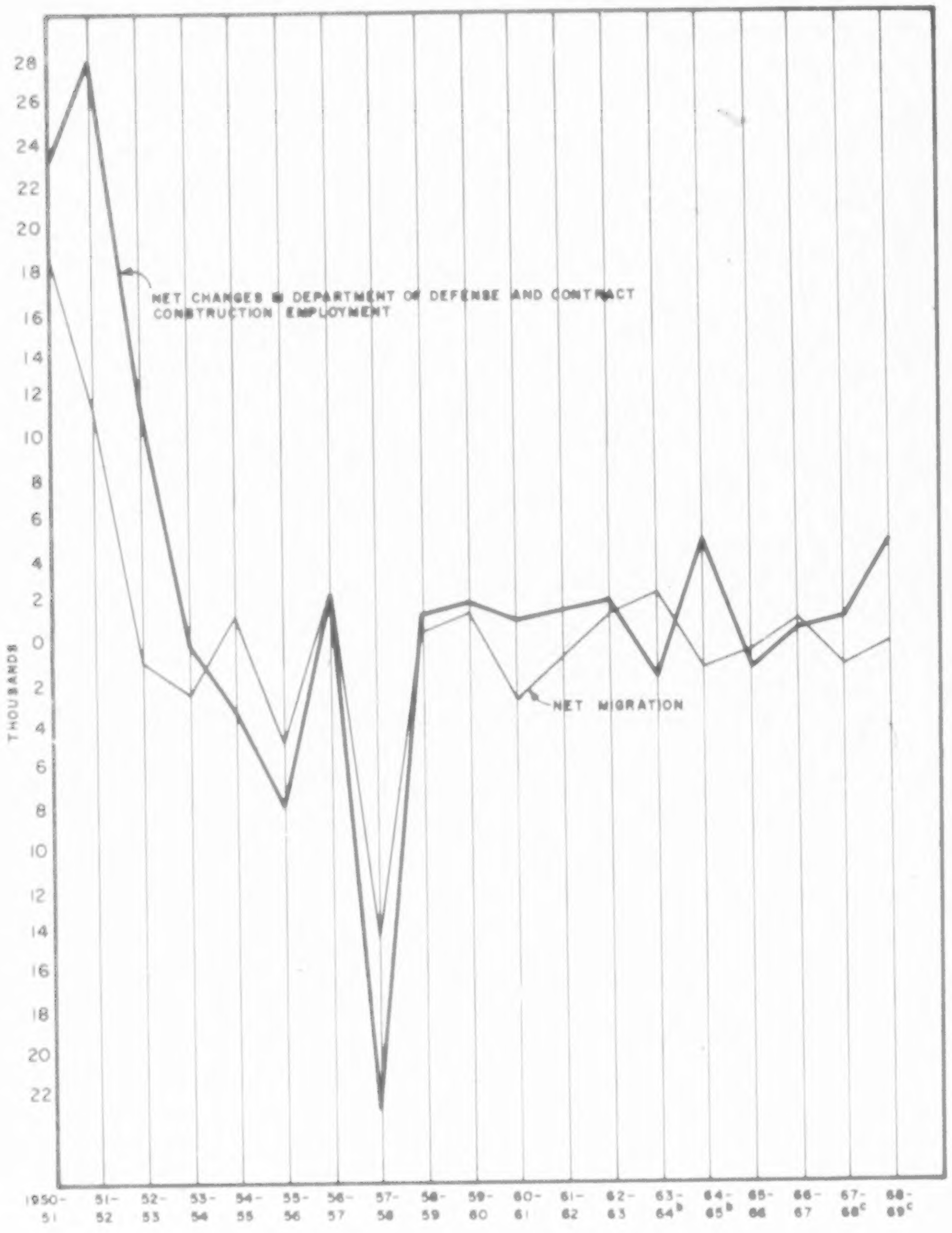
[b] Transportation, communication, public utilities, trade, finance, insurance, real estate, services, miscellaneous.

SOURCE: Adapted by G.W. Rogers from Alaska Department of Labor data.

FIGURE II-1

ANNUAL CHANGES IN DEPARTMENT OF DEFENSE[a] AND CONTRACT CONSTRUCTION EMPLOYMENT AND ANNUAL NET MIGRATION -- ALASKA 1950-1969

(thousands of persons)



NOTES TO FIGURE II-1

[a] Includes military personnel and civilian employees of Department of Defense.

[b] Distortion in normal migration due to 1964 Alaska earthquake and 1965 recovery (temporary evacuation and return).

[c] Reflects North Slope "mining" activities in 1968-1969.

SOURCE: Alaska Department of Labor, *Workforce Estimates* and *Current Population Estimates.*

payrolls in the state since 1965 has been about twice the increase in personal income from oil and gas payrolls over the same period. We have noted the influence of the federal presence in Alaska on population movement, employment and personal income. Shifts in federal spending have clearly been the main cause of economic fluctuations in the state's overall economy.

General categories of industrial composition of Alaska personal income for 1970 are compared with those of the entire U.S. in Figure II-2. Despite a population increase of about one-third in the period since statehood, Table II-2 demonstrates that there has been little change in the proportion of income coming from various sectors of the economy. During the period since 1959, the oil and gas industry grew to provide about 3 percent of total income, replacing about half of the loss of relative weight by military payrolls; 5 to 6 percent of total income from government services shifted from the federal to the state and local levels. Other changes included the virtual disappearance of mining other than oil and gas, and a substantial increase in professional, social and related services.

Patterns of Employment

The patterns of employment in Alaska over time and among industries are influenced by the same forces that determine the pattern of personal income. The pre-World War II Alaska economy was underdeveloped with a specialized dependence on employment in gold mining and salmon canning. Employment between 1950 and 1969 was dominated by the Department of Defense and civilian government employment, which combined accounted for more than half the total employed workforce: 53.1 percent in 1950, and 50.3 percent in 1969.

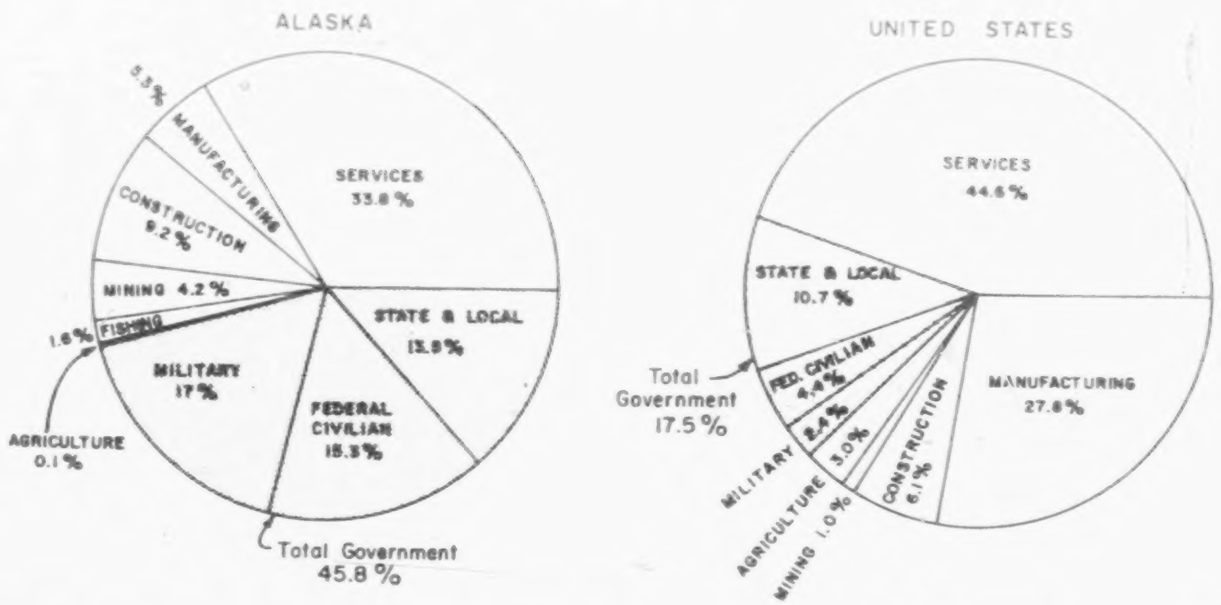
Total employment increased during the fifties primarily because of a rise in defense employment. Since 1960, other sectors of the economy have gained strength. A large part of the growth during the 1960's can be interpreted as an expansion in the support sector in response to gains made in the economic base sector during the previous decade. "Import substitution" proceeded in the distributive and other service industries. This included expansion of state and local government as Alaska assumed full statehood.

Despite the stability of defense employment in the 1960's, total employment rose from 100,700 in 1960 to 136,200 in 1970.[9] There were continuing increases in employment in commodity producing industries—from 12,800 in 1960 to 19,000 in 1970—but the major increases came from the distributive industries, which employed 21,400 workers in 1960 and 38,200 in 1970.

FIGURE II-2

STRUCTURAL COMPARISON OF ALASKA AND UNITED STATES ECONOMIES

Industrial Origin of Income Received by Persons for Participation in Production, 1970



SOURCE: Personal income from military wage and salary disbursements (Survey of Current Business, August 1971, tables 4 and 62A) has been added to estimates of industrial sources of civilian income received by persons for participation in current production (loc. cit., Table 70). The division between income from federal government civilian activities and state and local government was derived from the respective proportions of each in personal income by major sources (loc. cit., tables 4 and 62A). All income in "other industries" in Alaska was assumed to originate in fishing.

Between 1960 and 1970, employment in the Department of Defense declined from 41.5 percent of the total employed workforce to 28.6 percent; commodity producing industries rose from 12.5 percent to 14.0 percent; distributive industries from 21.4 percent to 28.0 percent; and government (other than defense) rose from 14.2

TABLE II-2

PERSONAL INCOME BY MAJOR SOURCES, ALASKA, 1959 and 1970

	1959	1970
	percentage	
PERSONAL INCOME	100.0	100.0
WAGE AND SALARY DISBURSEMENTS	82.5	84.1
Farms	a	a
Mining	1.6	3.5
Coal mining	*.5*	.1
Crude petroleum and natural gas	*.5*	3.2
Mining and quarrying except fuel	*.7*	.2
Contract construction	8.6	7.6
Manufacturing	3.8	4.3
Durables		2.0
Nondurables		2.3
Wholesale and retail trade	8.3	9.4
Finance, insurance and real estate	1.4	2.0
Banking	*.7*	.8
Other finance, insurance and real estate	*.5*	1.2
Transportation, communications and public utilities	7.4	7.6
Railroad transportation	*.2*	.4
Highway freight and warehousing	*1.1*	1.3
Other transportation	*4.0*	3.2
Communications and public utilities	*2.2*	2.7
Services	4.5	7.3
Hotels and other lodging places	*.5*	.6
Personal services and private households	*.7*	.6
Business and repair services	*1.1*	1.6
Amusement and recreation	*.2*	.1
Professional, social and related services	*1.8*	4.1
Government	45.9	41.7
Federal, civilian	*19.0*	13.9
Federal, military	*20.4*	15.6
State and local	*6.1*	12.3
Other industries[b]	.9	.4
OTHER LABOR INCOME	2.0	3.1
PROPRIETORS INCOME	7.0	5.1
Farm	.4	a
Nonfarm	7.2	5.1
PROPERTY INCOME	6.1	5.6
TRANSFER PAYMENTS	4.0	5.5
LESS PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE	2.5	3.4

[a] less than 0.05 percent

[b] includes fisheries

percent to 20.6 percent. Thus, the total rate of growth in Alaska's economy has been steadily upward during the 1970's, but this movement reflects a composite of forces, most advancing though at different rates, yet some remaining stagnant or even declining.

Regional Differences

The composition of the workforce differs among the four major regions of Alaska. Table II-1, above, shows the contrasting structures and differing growth rates of the various regions. The southeast and southwest regions (the two smallest in terms of population and employment) have significant commodity producing elements. Only the southeast region has a minor defense element; in the other three, a quarter to half of the workforce is employed in the Department of Defense. On the other hand, the state capital is in the southeast region, and government there employs a significant proportion of the workforce. The southcentral and southwest regions had the greatest change in industrial composition between 1961 and 1969. The population-workforce ratios are also important indicators of regional differences. The southwest region has an abnormally low labor force participation rate due to the large rural Native population.**

Seasonal and Cyclical Fluctuations

Figure II-3 displays the seasonal profile of employment and unemployment in Alaska from 1966 to 1970. Average total employment in the peak month (July) is typically more than 25 percent higher than that of the lowest month (January). In contract construction, the peak is two and one half times the trough; and in food processing, the ratio is more than four to one.* These two seasonal industries alone directly account for more than half the total employment fluctuation in the state; undoubtedly they also contribute heavily to seasonality in the support sectors, particularly transportation.†

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*The leading subgroups in each of these categories (highway and heavy construction contractors and fish canning, respectively) have even more severe seasonal swings. Also, the employment figures understate the seasonal fluctuation in each industry; because of overtime wage payments, the ratios between the peaks and troughs in payrolls are substantially higher than those in Figure II-3.

†Other highly seasonal industries include logging, lumber and pulp (the fluctuation is concentrated in logging; pulp mill employment is seasonally stable), and tourist services, which cannot be separated from other transportation, lodging, etc., activity in the employment series.

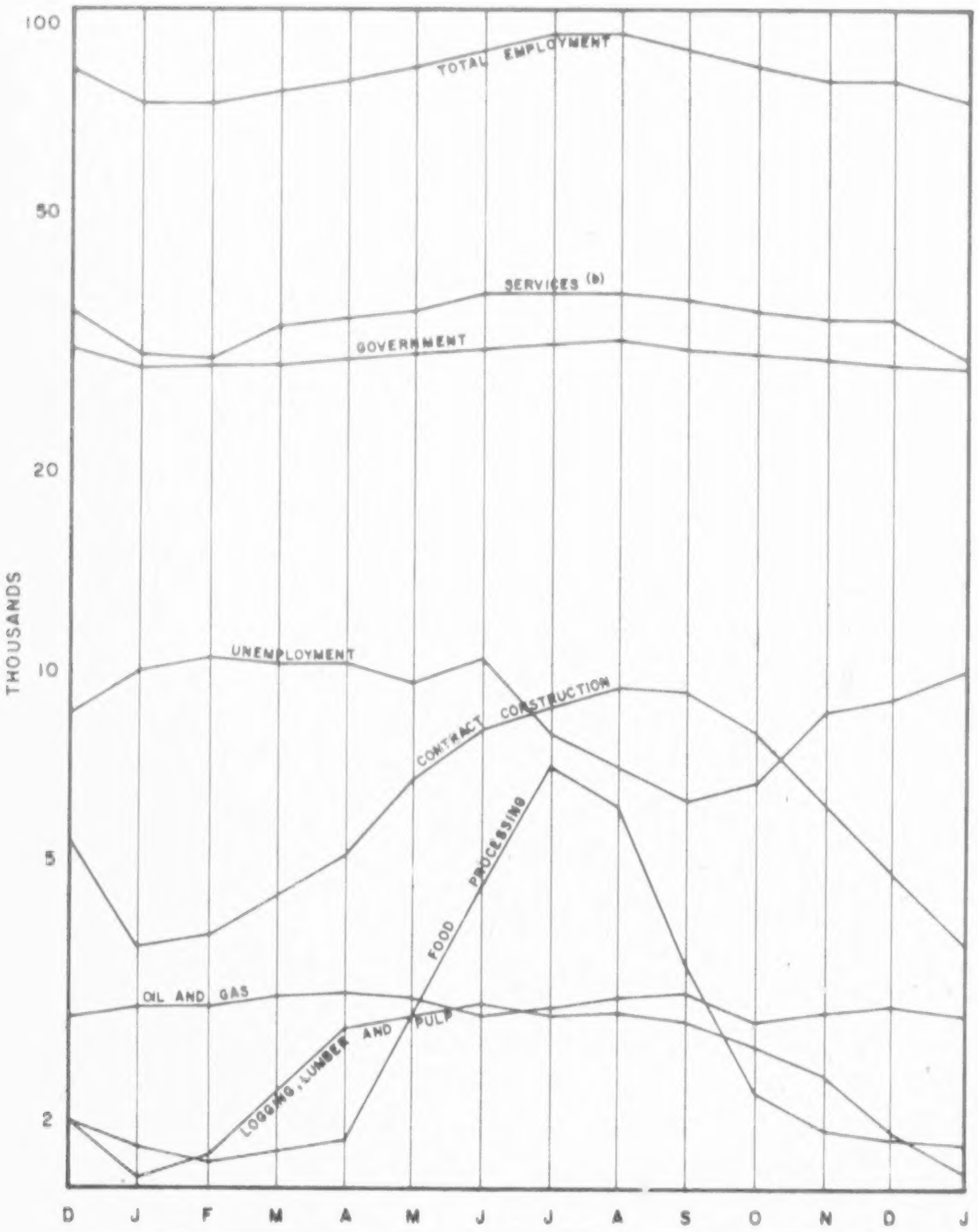
**See Figure II-1.

FIGURE II-3

SEASONALITY: AVERAGE EMPLOYMENT AND UNEMPLOYMENT BY MONTHS, ALASKA

September 1966-September 1970, Adjusted for Trend[a]

(Semi-log Scale)



NOTES TO FIGURE II-3

[a] 1968 average employment and unemployment were adjusted to average 1966-70 seasonal pattern as follows. Employment monthly average data for September 1966 to September 1970 are from Alaska Department of Labor, Employment Security Division, *Statistical Quarterly;* Unemployment from Alaska Department of Labor *Workforce Estimates.* Trend adjustment is by division of exponential trend rate into ratio between geometric means of figures for successive calendar months. Resulting ratios were applied to 1968 annual average employment or unemployment to give trend adjusted averages.

[b] Services includes Transportation, Communication and Public Utilities; Wholesale and Retail Trade; Finance, Insurance and Real Estate; and Services.

Government and oil and gas industry employment appear relatively stable in Figure II-3. It is true that direct employment in these two sectors is relatively unaffected by seasonal considerations. However, as has been discussed, the Defense Department has been a major source of non-seasonal fluctuation in employment.** Moreover, government has historically been, and the petroleum industry now promises to be, the biggest purchaser of heavy construction services, which are prone to large fluctuations, both seasonal and cyclical.

The unstable nature of petroleum-related employment can be seen in the 1965-70 boom and recession in the Kenai-Cook Inlet area. The climax of development drilling there coincided with the construction of a gas liquefaction plant, a natural gas fed ammonia-urea plant, a small new refinery and an addition to another refinery. Average petroleum-related employment, including construction, increased from less than 200 in the early months of 1965 to a peak of almost 3,000 in September 1968. It then fell steadily and finally leveled off at slightly more than 1,000 throughout 1970. Figure II-4 describes the rise and fall of petroleum-related employment in Kenai during this period. The figure also points up the seeming independence of unemployment from the level of employment, at least during the growth phase of the cycle.

Unemployment

Official unemployment rates in Alaska are consistently much higher than national averages. The statewide annual average unemployment rate from 1966 through 1970 ranged from 8.7 to 11.4 percent, while national averages were 3.5 to 4.9 percent. However, interpretation of the difference is not simple. On the one hand, much of the difference can be accounted for by the fact that a substantial proportion of the Alaska "unemployed" at any particular time are not permanent members of the state's labor force. Moreover, seasonal factors account for a very large portion of total unemployment; in the calendar month of lowest unemployment in Alaska the state unemployment rate is typically only about two percentage points above the national figure.

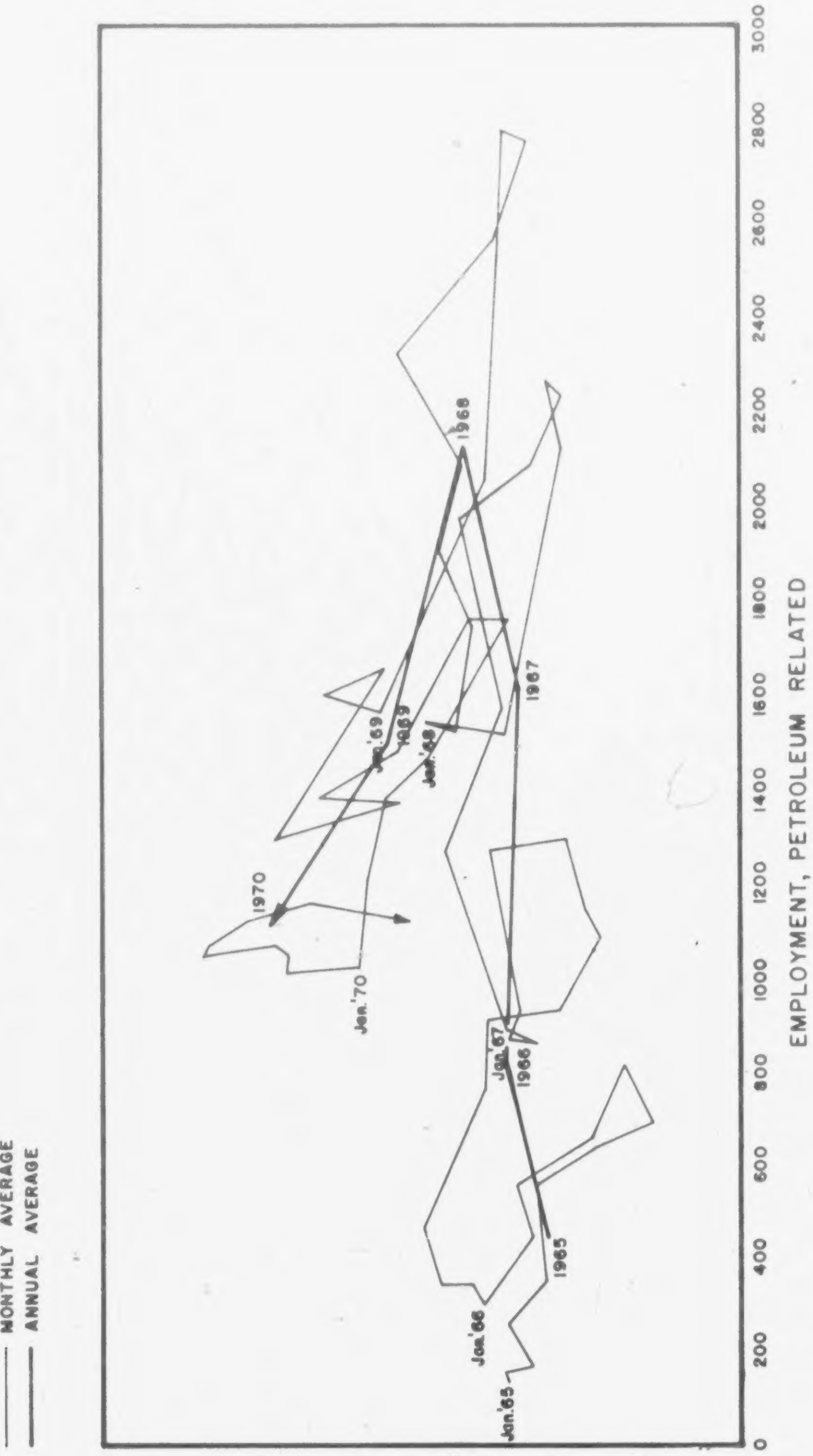
On the other hand, the difference between Alaska and U.S. unemployment rates would be even greater if all rural joblessness were counted as unemployment in official state reports. Lack of work among rural Natives, for example, now largely appears only as low labor force participation rates.

A specific evaluation of the contribution of seasonal and other fluctuations to unemployment would require a complex analysis that is inappropriate here. Yet it is known that the annual swing in total employment is about twice the average number of unemployed, and amounts to more than four times the difference between the greatest and smallest monthly number of unemployed.

Because of the exceptionally large role of transients and the large turnover in labor force, the relationship between employment and unemployment is not one-to-one, nor is it symmetrical for increases and decreases in employment. The greatest number of unemployed is typically recorded in June, which is also a high employment month, because of the influx of transients to Alaska and the entrance of vacationing students and graduates (many of them in turn transients or immigrants) into the labor market. October unemployment levels

FIGURE II-4

EMPLOYMENT IN PETROLEUM-RELATED ACTIVITIES, AND UNEMPLOYMENT
KENAI-COOK INLET LABOR MARKET AREA, 1965-1970



SOURCE: Alaska Department of Labor, Employment Security Division.

are typically lower than those for July, despite much lower levels of employment, because students and many of the transients leave the Alaska labor market.

Native Unemployment and Underemployment

The low rate of labor force participation by Alaska Natives is indirectly reflected in Table II-1, above. This characteristic is compounded by a high rate of unemployment on the part of those Natives counted in the labor force.

Undoubtedly there is some institutional discrimination against Natives in employment, and there may be aspects of their cultural patterns which inhibit labor force commitment or otherwise make many Natives "unemployable." The most important measurable influences on Native unemployment, manifest and disguised, are their location outside the principal areas of economic activity and their low level of educational achievement.

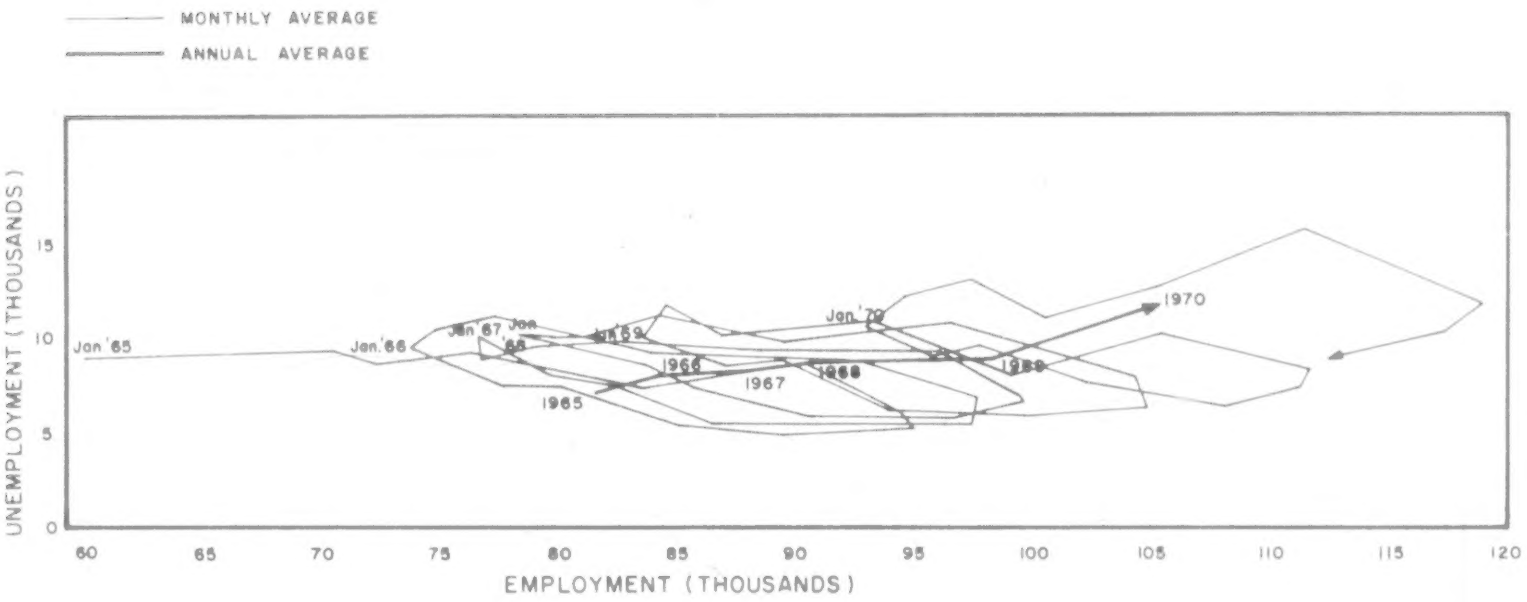
While there are large regional differences, Alaska Natives lag substantially behind whites in their level of educational attainment. According to the 1960 census, the median education of white Alaskans was 12.4 years, while the median education of Native Alaskans ranged from 1.6 to 7.0 years in census districts in northern and western Alaska and from 8.2 to 9.0 years in districts in southeastern Alaska. Since the number of Native graduates from both high school and college has risen substantially in the last ten years, 1970 census figures will probably indicate gains in level of Native educational attainment. These gains result from the increased numbers of Native students who attend high school. Special orientation programs for Native college students are increasing the number of Native college graduates. In addition, recent legislation has made it possible for Alaska Natives to obtain more state government jobs, and new types of positions have been created which require only completion of special college training programs. However, these improvements will in the near future still not enable the majority of the Alaska Native population to obtain the educational prerequisites for available employment.

High Unemployment with High Employment

Perhaps the most significant inference from the employment-unemployment relationship is that increased employment does not consistently mean fewer unemployed. In the long run particularly, the growth of employment has little effect on unemployment; the correlation, if any, is weakly positive (probably reflecting the increased frictional employment component). Employment and unemployment figures for Alaska from 1965-70 (Figure II-5) point up the lack of consistent interrelation.

FIGURE II-5

EMPLOYMENT AND UNEMPLOYMENT IN ALASKA, 1965-1970



SOURCE: Alaska Department of Labor, Employment Security Division.

The lack of an inverse correlation between changes in employment and unemployment is not surprising. Job opportunities in Alaska have an attraction throughout a nationwide labor force of 80 million. The Puget Sound area alone has about as many workers now unemployed as there are jobs in Alaska. Oil and gas development in Alaska can draw on a force of perhaps 200,000 former oil industry workers not now employed in the industry because of workforce reductions in the older oil-producing states.

As a consequence of the above considerations:

1. Direct reduction of unemployment in Alaska is generally not a reasonable expectation from (nor a realistic objective of) growth of the oil and gas industry or other industry in the state.

2. In the long run, net changes in employment in Alaska will approximately be matched by changes in the size of the labor force reflecting net migration.

3. The immediate effect of employment increases on total or resident unemployment is difficult to predict, depending in part upon the number of job seekers immigrating in response to their impressions of employment opportunities in the state.

4. Without further complex analysis, it is not possible to predict whether the growth of the oil and gas industry as a proportion of the state's economic base will increase or decrease the relative amplitude of seasonal fluctuations in employment, taking into account the induced demand for construction and transport services. Seasonality in construction appears to be diminishing somewhat; but if there is no great permanent progress in dealing with the environmental and institutional causes of seasonal fluctuations in construction activity, petroleum-induced economic growth in Alaska will surely increase the *absolute* amplitude of seasonal employment variation.[18] A continuation of this pattern will perpetuate annual unemployment rates that are higher than national averages.

Prices and Costs

Almost everything costs more in Alaska than it does in the "lower 48." The size of the Alaska-U.S. price differential varies widely among places in the state, with the lowest differential occurring in the Anchorage area. The most severe differential, with costs in some cases two or three times national averages, are in the remote northern and western regions. The differential also varies by commodity. The cost of housing and all construction is considerably further above average than are the prices of manufactured goods. Table II-3 summarizes 1970 family budget costs for three levels of living in Anchorage, as a proportion of the U.S. urban average, and of the U.S. non-metropolitan average.* Housing alone accounted for most of the difference between Anchorage and the U.S. urban average: 55 percent in the lower budget, 57 percent in the intermediate budget and 61 percent in the higher budget.

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*The non-metropolitan average might be regarded as a more appropriate comparison because Anchorage is not a Standard Metropolitan Statistical Area (SMSA).

TABLE II-3

COMPARISON OF ANCHORAGE FAMILY BUDGET COSTS WITH U.S. AVERAGES, SPRING 1970

	Lower Budget	Intermediate Budget	Higher Budget
		(dollars)	
TOTAL BUDGET COST			
Anchorage	$10,783	$14,535	$20,301
All non-metropolitan areas, U.S.	6,512	9,600	13,459
U.S. urban average	6,960	10,664	15,511
	(U.S. non-metropolitan average = 100)		
ANCHORAGE BUDGET COST	166	151	151
		(U.S. urban average = 100)	
ANCHORAGE BUDGET COST	155	136	131
Total Family Consumption	149	132	126
Food	121	116	113
Housing	205	160	148
Transportation	172	128	116
Clothing and personal care	119	118	115
Medical care	157	157	156
Other family consumption	95	95	96
Personal Income Taxes	231	175	159

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics.

Alaska living costs are steeply biased against low income families. The total cost of a "high standard" budget in Anchorage in 1970 was 31 percent higher than its U.S. average urban counterpart, but the cost of a "low standard" budget was 55 percent higher. Differentials are greatest in the lowest budget level in almost every expenditure category, but the most extreme contrasts are in housing costs. The Anchorage cost of housing was 105 percent higher than the national urban level at the lower budget level and only 48 percent at the higher.

Economists do not completely agree on the causes of Alaska's high prices, but the extreme climate and transportation costs are only a part—possibly a minor part—of the explanation. The small size of Alaska market limits competition and minimizes the gains from scale economies. Small markets also reduce the potential returns from innovations adapting processes or products to the Alaska environment. Severe seasonal fluctuations in production and sales inflate the costs of fixed plant per unit of output, recruitment and termination costs, and inventory to sales ratios. Abrupt changes in government and industrial activity reverberate throughout the economy, alternately creating bottlenecks and oversupplies. All these combine to build high implicit charges for risk into the returns to both labor and capital.

The price and cost differentials, at least between the Anchorage area and the other states, have declined somewhat in recent years as population and income growth have expanded the economic infrastructure and the support sector. Since 1961, the Anchorage Consumer Price Index has advanced only 20 percent, compared to an increase of 35 percent for the U.S. urban average. This means that the cost of living in Anchorage for a family on an intermediate budget is now 32 percent higher instead of 48 percent higher than the national urban average. Significantly, over half of the fall in the differential has occurred in the last three years, during a time in which Anchorage has experienced very rapid growth and a construction boom.

ANNEX A-2

DEMOGRAPHIC STATISTICS, POPULATION PROJECTION METHODOLOGY AND SOURCE REFERENCES

a. Demographic Statistics

table I-1

Alaska's Population, 1970 Compared to 1960, on the Basis of the 1960 Census Districts

	1960 Census District Number	1970 Population	1960 Population	Percent Change
Alaska Total	-----	302,647	226,167	34
Prince of Wales	1	2,106	1,772	19
Ketchikan	2	11,717	10,070	16
Wrangell-Petersburg	3	4,966	4,181	19
Sitka	4	6,549	6.690	-2
Juneau	5	13,566	9.745	39
Lynn Canal-Icy Straits	6	3,661	2,945	24
Cordova-McCarthy	7	1,857	1,759	6
Valdez-Chitina-Whittier	8	3,098	2,844	6
Cordova-Chitina-Whittier	8	3,098	2,844	9
Palmer-Wasilla-Talkeetna	9	6,463	5,188	25
Anchorage	10	126,345	82,833	53
Seward	11	2,336	2,956	-21
Kenai-Cook Inlet	12	14,250	6,097	134
Kodiak	13	9,409	7,174	31
Aleutian Islands	14	8,057	6,011	34
Bristol Bay	15	4,632	4,024	15
Bethel	16	7,767	5,537	40
Kuskokwim	17	2,306	2,301	0
Yukon-Koyukuk	18	5,038	4,097	23
Fairbanks	19	50,043	43,412	15
Upper Yukon	20	1,684	1,619	4
Barrow	21	2,663	2,133	25
Kobuk	22	4,434	3,560	25
Nome	23	5,749	6,091	-6
Wade Hampton	24	3,917	3,128	25

SOURCE: Alaska Department of Labor, Economic Analysis, Vol. I, Issue 5, June, 1971

table I-2

Enrollment of Alaskan Students in Public, Private and Denominational, and Bureau of Indian Affairs Schools Inside and Outside Alaska
Fiscal Years 1960 - 1970

Fiscal Year	District Schools	State Operated Schools	Private & Denominational Schools	BIA Schools	Enrollment All Schools
			Enrollment		
1960	27,035	13,180	1,674	5,489	47,378
1961	30,739	13,779	1,735	6,025	52,278
1962	32,028	15,196	1,876	6,226	55,326
1963	34,514	15,815	2,118	6,682	59,129*
1964	36,291	15,893	2,298	7,239	61,721*
1965	43,329	13,300	2,382	7,613	66,624
1966	45,081	14,067	2,402	7,816	69,366
1967	48,025	14,489	2,451	8,112	73,077
1968	52,143	16,060	2,145	7,449	76,797
1969	56,527	14,920	1,918	6,992	80,357
1970	60,111	15,994	1,618	7,062	84,785
			Percent of 1960		
1960	100.0	100.0	100.0	100.0	100.0
1961	113.7	104.5	103.6	109.8	110.3
1962	118.5	115.3	112.1	113.4	116.8
1963	127.7	120.0	126.5	121.7	124.8
1964	134.2	120.6	137.3	131.9	130.3
1965	160.3	100.9	142.3	138.7	140.6
1966	166.8	106.7	143.5	142.4	146.4
1967	177.6	109.9	146.4	147.8	154.2
1968	192.9	114.3	128.1	135.7	162.1
1969	209.1	113.2	114.6	127.4	169.6
1970	222.3	121.4	96.7	128.7	179.0

*Kindergarten reports not complete for this year.

SOURCE: Alaska Department of Education.

table I-3

Population of Alaska, 1740 - 1970

		Increase or Decrease over Preceding Year				Increase or Decrease over Preceding Year	
Year	Population	Number	Percent	Year	Population	Number	Percent
1740	74,700	-----	-----				
1840	40,716	-33,984	-45.4	1961	238,000	11,833	5.2
				1962	246,000	8,000	3.4
1880	33,426	-7,290	-17.9	1963	256,000	10,000	4.1
1890	32,052	-1,374	-4.1	1964	263,000	7,000	2.7
1900	63,592	31,540	98.4	1965	271,000	8,000	3.0
1910	64,356	764	1.2	1966	271,000	0	0
1920	55,036	-9,320	-14.5	1967	278,000	7,000	2.6
1929	59,278	4,242	7.7	1968	285,000	7,000	2.5
1939	72,524	13,246	22.3	1969	296,000	11,000	3.9
1950	128,643	56,119	77.4	1970	302,647	6,647	2.2
1960	226,167	97,524	75.8				

SOURCE: U.S. Bureau of the Census and estimates by George Rogers and Richard Cooley.

1740 estimate based on J. R. Swanton: The Indian Tribes of North America, Washington: Bureau of Ethnology, 1952.

1840 estimate based on Petrov: Report on the Population Industries and Resources of Alaska, 1884. The count was actually taken in 1839.

1880-1960 census taken on April 1st, expected for 1900, June 1st; 1909, December 31st; 1920, January 1st; and 1929 and 1939, October 1st.

1961-1969 figures refer to estimated July 1st population: U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 460, June, 1971.

1970 figures are based on the 1970 census of population taken on April 1st.

table I-4

Alaska Births and Deaths for White and Native Population: 1950 - 1970

Year	Births						Deaths					
	All Races		White		Native		All Races		White		Native	
	Number	Rate[a]	Number	Rate[a]	Number	Rate[a]	Number	Rate[a]	Number	Rate[a]	Number	Rate[a]
1950	3,758	27.8	2,361	23.8	1,376	40.5	1,269	9.4	674	6.8	571	16.8
1951	4,574	28.9	3,007	25.0	1,534	44.5	1,379	8.7	729	6.0	620	18.0
1952	5,852	30.1	4,184	27.9	1,591	45.5	1,292	6.8	733	4.9	542	15.5
1953	6,864	33.5	5,151	31.4	1,582	43.9	1,327	6.5	796	4.9	502	13.9
1954	7,096	33.0	5,262	30.6	1,666	45.0	1,227	5.7	771	4.5	420	11.4
1955	2,410	33.4	5,466	30.9	1,729	45.5	1,251	5.6	839	4.7	379	10.0
1956	7,659	34.2	5,486	31.0	1,908	48.9	1,240	5.5	762	4.3	446	11.4
1957	7,889	34.2	5,703	31.2	1,846	46.2	1,279	5.5	809	4.4	439	11.0
1958	7,115	31.8	4,888	27.9	1,953	47.6	1,190	5.3	774	4.4	394	9.6
1959	7,068	31.6	4,794	27.6	2,015	48.0	1,201	5.4	746	4.3	416	9.9
1960	7,518	33.0	5,133	29.1	2,059	48.1	1,265	5.5	824	4.7	404	9.4
1961	7,586	32.2	5,120	28.1	2,111	48.3	1,283	5.4	820	4.5	432	9.9
1962	7,675	31.5	5,152	27.3	2,170	48.7	1,308	5.4	839	4.4	429	9.6
1963	7,676	30.6	5,164	26.5	2,152	47.2	1,332	5.3	855	4.4	441	9.7
1964	7,266	28.1	4,854	24.1	2,048	44.0	1,438	5.6	924	4.6	473	10.2
1965	7,063	26.5	4,656	22.4	2,084	44.0	1,400	5.3	893	4.3	449	9.5
1966	6,605	24.1	4,350	20.3	1,943	40.1	1,333	4.9	810	3.8	478	9.9
1967	6,317	22.5	4,340	19.7	1,702	34.5	1,297	4.6	853	3.9	405	8.2
1968	6,453	22.3	4,563	20.1	1,587	31.6	1,353	4.7	924	4.1	391	7.8
1969	6,913	23.3	5,097	21.9	1,519	29.7	1,300	4.4	871	3.7	379	7.4
1970	7,560	24.9	5,488	22.9	1,718	33.0	1,431	4.7	983	4.1	379	7.3

NOTE: [a]Rates are births or deaths per 1,000 population.

SOURCE: Alaska State Department of Health & Welfare, Statistical Section.

table I-5

DISTRIBUTION OF ALASKA NATIVES BY SIZE OF PLACE, 1970

Total Size of Place	No. of Places	Native Population[a]	Cumulative Totals No. of Places	Cumulative Totals Native Population
25-99	50	2,842	50	2,842
100-199	65	7,755	115	10,597
200-299	32	6,136	147	16,733
300-399	23	5,021	170	21,754
400-499	18	5,226	188	26,980
500-599	3	663	191	27,643
600-699	1	37	192	27,680
700-799	3	652	195	28,332
800-899	2	522	197	28,854
900-999	1	567	198	29,421
1000-1499	14	1,870	212	31,291
1500-1999	7	2,253	219	33,544
2000-2999	9	6,457	228	40,001
3000-4999	7	2,016	235	42,017
5000-9999	9	3,466	244	45,483
10,000-19,999	2	1,718	246	47,201
20,000-49,000	2	3,684	248	50,885

[a] In Alaska, Aleuts and Eskimos are considered together with Indians as the native Alaska population. However, the 1970 Census first count combines Aleuts and Eskimos with Chinese, Japanese, and Filipinos as the other specified races. In order to estimate the population of Aleuts and Eskimos from the other specified races, it is assumed that the populations of Chinese, Japanese and Filipino change at the same rate as the white between 1960 and 1970. The 1970 population for Chinese, Japanese, and Filipino is estimated by multiplying the 1960 population for Chinese, Japanese, and Filipino by one plus the rate of population change of the white between 1960 and 1970. The number of Aleuts and Eskimos is then estimated by subtracting out the estimated 1970 population of Chinese, Japanese and Filipino from the other specified races.

SOURCE: Estimated from the 1970 Census of Population, first count.

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(When population in the vicinity is added to that of the village proper, the village population is shown in parentheses.) Further information in detailed listing.
(Source: 1970 Census enumeration district maps and Census first count microfilm.)

Place and Region	Census ED Map	Population				Remarks
		All Races	Total Natives	Indian	Aleut & Eskimo*	
Afognak, Afognak Island	18-N	NA	NA	NA	NA	Part of a large ED.
Akhiok, Kodiak	17-P	115	113	0	113	
Akiachak, SW Coastal Lowland	15-L	312	300	1	299	Vicinity 0.
Akiak, SW Coastal Lowland	15-L	184(171)	181(169)	0	181(169)	
Akutan, Aleutian	12-R	101	90	1	89	Vicinity 1, race not shown.
Alakanuk, SW Coastal Lowland	14-J	414(265)	395(247)	0	395(247)	
Alatna, Koyukuk-Lower Yukon						See Allakaket.
Aleknagik, Bristol Bay	16-M	128	97	0	97	Also 59 natives in area between Aleknagit and Dillingham.
Allakaket, Koyukuk-Lower Yukon	18-F	174	168	124	44	Includes Alatna. Vicinity 0.
Ambler, Bering Strait	16-E	176(169)	160(159)	0	160(159)	
Anaktuvuk Pass, Arctic Slope	18-D	99	97	0	97	Vicinity 0.
Andreafsey, SW Coastal Lowland						Included in St. Mary's.
Aniak, SW Coastal Lowland	15-K	205	170	0	170	Vicinity 0.
Anvik, Koyukuk-Lower Yukon	15-J	83	75	75	0	Vicinity 0.
Arctic Village, Upper Yukon-Porcupine	20-D	85	82	82	0	Vicinity 0.
Atka, Aleutian	7-U	88	86	1	85	Vicinity 0.
Atkasook, Artic Slope	16-B	0	0	0	0	Vicinity 0.
Atmautluak, SW Coastal Lowland	NA	NA	NA	NA	NA	Not located; may be near Nunapitchuk.
Barrow, Arctic Slope	16-A	2152(2104)	1908(1906)	8(8)	1900(1898)	
Beaver, Upper Yukon-Porcupine	19-F	101	86	54	32	Vicinity 0.

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Place and Region	Census ED Map	Population				Remarks
		All Races	Total Natives	Indian	Aleut & Eskimo*	
Belkofsky, Aleutian	13-Q	59	53	0	53	Vicinity 0.
Bethel, SW Coastal Lowland	15-L	2416	1871	63	1808	Vicinity 0.
Bill Moore's SW Coastal Lowland	14-I	0	0	0	0	In a general area, population 0.
Biorka, Aleutian	11-S	0	0	0	0	Vicinity 0.
Birch Creek, Upper Yukon-Porcupine	20-F	0	0	0	0	Vicinity 0.
Brevig Mission, Bering Strait	13-G	123	118	0	118	Vicinity 0.
Buckland, Bering Strait	15-F,G	104	103	0	103	
Candle, Bering Strait	15-G	12(8)	10(6)	0	10(6)	Listed as Kiwalik Landing. Race estimated for 4 in vicinity.
Cantwell, Tanana	19-I	62	43	38	5	Big area around Cantwell has 2 natives, 34 whites.
Canyon Village, Upper Yukon-Porcupine	21-E	0	0	0	0	
Chalkyitsik, Upper Yukon-Porcupine	21-E	130	123	123	0	Vicinity 0.
Chanilut, SW Coastal Lowland	14-I	1	1	0	1	Race estimated. Vicinity 0.
Cherfornak, SW Coastal Lowland	14-L	146	141	0	141	Vicinity 0.
Chevak, SW Coastal Lowland	13-K	387	376	0	376	Vicinity 0.
Chignik, Kodiak	15-P	83	67	0	67	Vicinity 0.
Chignik Lagoon, Kodiak	15-P	45(6)	30(2)	0	30(2)	
Chignik Lake, Kodiak	15-P	117	115	1	114	Vicinity 0.
Chistochina, Copper River	20-J	33	17	17	0	
Chitina, Copper River	20-K	38	6	3	3	
Chukwuktoligamute, SW Coastal Lowland	14-K	0	0	0	0	Chakwaktolik on map. Vicinity 0.

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Place and Region	Census ED Map	Population				Remarks
		All Races	Total Natives	Indian	Aleut & Eskimo*	
Circle, Upper Yukon-Porcupine	20-G	54	32	32	0	Also 5 in vicinity, all white.
Clark's Point, Bristol Bay	15-N	95	75	0	75	Vicinity 0.
Copper Center, Copper River	20-K	206	93	91	2	
Crooked Creek, Upper Kuskokwim	16-K	103(59)	99(55)	11(11)	88(44)	
Deering, Bering Strait	14-F	85	83	1	82	Vicinity 0.
Dillingham, Bristol Bay	16-M	914	587	13	574	Also 59 natives and 32 other persons in area between Dillingham and Aleknagit.
Dot Lake, Tanana	20-I	42	29	29	0	
Eagle, Upper Yukon-Porcupine	21-H	103(36)	58(4)	58(4)	0	
Eek, SW Coastal Lowland	14-L	186	167	0	167	Vicinity 0.
Egegik, Bristol Bay	16-N	153(148)	76(74)	0	76(74)	
Eklutna, Cook Inlet	19-K	25	23	23	0	Natives in nearby towns.
Ekuk, Bristol Bay	15-N	51	50	0	50	Vicinity 0.
Ekwok, Bristol Bay	16-M	103	94	0	94	Vicinity 0.
Elim, Bering Strait	14-H	174	168	0	168	Vicinity 0.
Emmonak, SW Coastal Lowland	14-J	439	421	0	421	Listed as Emangak in Census. Also 1 person in vicinity, race not given.
English Bay, Cook Inlet	18-M	58	53	0	53	
False Pass, Aleutian	13-R	62	58	1	57	Vicinity 0.
Fort Yukon, Upper Yukon-Porcupine	20-F	448	376	369	7	Also 3 natives and 82 others at A.F. Station. Rest of vicinity 0.
Gakona, Copper River	20-J	88	23	21	2	
Galena, Koyukuk-Lower Yukon	16-H	302	265	264	1	Also 29 natives & 393 others at 2 A.F. Bases. Rest of vicinity 0.

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Place and Region	Census ED Map	Population				Remarks
		All Races	Total Natives	Indian	Aleut & Eskimo*	
Gambell, Bering Sea	12-I	372	356	0	356	
Georgetown, Upper Kuskokwin	16-K	12	12	0	12	Vicinity 0.
Golovin, Bering Strait	14-H	117	111	0	111	Vicinity 0.
Goodnews Bay, SW Coastal Lowland	15-M	218	210	0	210	Listed as Mumtrak in Census. Vicinity 0.
Grayling, Koyukuk-Lower Yukon	15-J	139	136	136	0	Vicinity 0.
Gulkana, Copper River	20-J	53	52	52	0	
Hamilton, SW Coastal Lowland	14-J	16	16	0	16	Vicinity 0.
Holy Cross, Koyukuk-Lower Yukon	15-J	216(199)	209(192)	143(127)	66(65)	
Hooper Bay, SW Coastal Lowland	13-K	490	477	0	477	Vicinity 0.
Hughes, Koyukuk-Lower Yukon	17-F	85	73	71	2	Vicinity 0.
Huslia, Koyukuk-Lower Yukon	16-G	159	151	151	0	Vicinity 0.
Igiugig, Bristol Bay	17-M	36	34	1	33	Vicinity 0.
Iliamna, Cook Inlet	17-M	58	23	18	5	Also 1, race not given, in vicinity of Iliamna and Newhalen.
Inalik, Bering Strait	13-G	84	82	0	82	Listed as Diomede in Census. Rest of island, 0.
Ivanof Bay, Aleutian	15-Q	48	46	0	46	Vicinity 0.
Kaguyak, Kodiak	18-P	59	33	0	33	
Kaktovik, Arctic Slope	21-B	123	108	1	107	Vicinity 0.
Kalskag, SW Coastal Lowland	15-K	122	106	0	106	Vicinity 0.
Kaltag, Koyukuk-Lower Yukon	16-H	206	193	192	1	
Karluk, Kodiak	17-P	98	95	0	95	

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Place and Region	Census ED Map	Population				Remarks
		All Races	Total Natives	Indian	Aleut & Eskimo*	
Kasigluk and Nunapitchuk SW Coastal Lowland	14-L	623(526)	605(512)	0	605(512)	Listed as Akolmiut in Census.
Kiana, Bering Strait	15-F	278	268	0	268	Vicinity 0.
King Cove, Aleutian	13-Q	283	252	3	249	Vicinity 0.
Kipnuk, SW Coastal Lowland	14-M	589(325)	579(320)	0	579(320)	
Kivalina, Bering Strait	14-E	188	183	0	183	Vicinity 0.
Kobuk, Bering Strait	16-F	165	160	1	159	Listed as Shungnak City in Census. Vicinity 0.
Kokhanok, Bristol Bay	17-M	88	67	0	67	Listed as Kakhonak in Census. Vicinity 0.
Koliganek, Bristol Bay	16-M	142	134	0	134	Vicinity 0.
Kongiganak, SW Coastal Lowland	14-M	190	183	0	183	Vicinity 0.
Kotlik, SW Coastal Lowland	14-I	228	224	0	224	Vicinity 0.
Kotzebue, Bering Strait	14-F	1696	1338	5	1333	Also 95 at A.F. Station (0 natives) and 4 in vicinity (race not given).
Koyuk, Bering Strait	15-H	122	121	0	121	Vicinity 0.
Koyukuk, Koyukuk-Lower Yukon	16-H	124	121	121	0	Vicinity 0.
Kwethluk, SW Coastal Lowland	15-L	408	390	1	389	Vicinity 0.
Kwigillingok, SW Coastal Lowland	14-M	148	145	0	145	Vicinity 0.
Larsen Bay, Kodiak	18-O	109	91	0	91	
Levelock, Bristol Bay	16-M	98(74)	82(60)	0	82(60)	
Lime Village, Upper Kuskokwim	17-K	25	25	0	25	Vicinity 0.
Lower Kalskag, SW Coastal Lowland	15-K	183	177	5	172	Vicinity 0.
McGrath, Upper Kuskokwim	17-J,L	279	110	58	52	Vicinity 0.

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Place and Region	Census ED Map	Population				Remarks
		All Races	Total Natives	Indian	Aleut & Eskimo*	
Makok, Koyukuk-Lower Yukon	15-J	0	0	0	0	Area between Holy Cross and Anvik.
Manley Hot Springs, Tanana	18-G,H	55(34)	27(11)	20(11)	7(0)	
Manokotak, Bristol Bay	15-N	214	205	0	205	Vicinity 0.
Marshall, SW Coastal Lowland	14-K	175	169	0	169	Also 1 in vicinity, race not given
Mary's Igloo, Bering Strait	13-G	0	0	0	0	Listed as Igloo on Census map. Vicinity 0.
Medfra, Upper Kuskokwin	17-I	Under 7	0	0	0	In a large ED with Telida.
Mekoryuk, SW Coastal Lowland	13-L	249	234	0	234	Vicinity 0.
Mentasta Lake, Copper River	21-J	68	64	54	10	
Minchumina Lake, Upper Kuskokwim	18-I	23(8)	1(1)	0	1(1)	
Minto, Tanana	19-H	168	159	158	1	Vicinity 0.
Mountain Village, SW Coastal Lowland	14-J	419	394	0	394	Vicinity 0.
Nabesna Village area except Northway, Tanana	21-J	NA	NA	NA	NA	Part of a huge area with 216 natives and 337 other persons.
Naknek, Bristol Bay	16-N	318(178)	84(38)	15(12)	69(26)	
Napaimute, Upper Kuskokwim	16-K	0	0	0	0	Included in a big ED.
Napakiak, SW Coastal Lowland	15-L	259	255	0	255	Listed as Napaskiak in Census reports, but corrected on page 3-5 of Census publication PC(1)-A3, "Number of Inhabitants."

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Place and Region	Census ED Map	Population				Remarks
		All Races	Total Natives	Indian	Aleut & Eskimo*	
Napaskiak, SW Coastal Lowland	15-L	188	NA	NA	NA	Corrected in same report as Napakiak. Race not given.
Nelson Lagoon, Aleutian	14-Q	43	39	0	39	Vicinity 0.
Nenana, Tanana	19-H	362	142	110	32	Also 13 natives and 122 other persons in 2 areas around Nenana.
Newhalen, Cook Inlet	17-M	88	83	3	80	Also 1 person in vicinity, race not given.
New Stuyahok, Bristol Bay	16-M	216	208	0	208	Vicinity 0.
Newtok, SW Coastal Lowland	14-L	114	111	0	111	Vicinity 0.
Nightmute, SW Coastal Lowland	14-L	127	122	0	122	Vicinity 0.
Nikolai, Upper Kuskokwim	17-I	112	101	100	1	Vicinity 0.
Nikolski, Aleutian	10-T	57	52	0	52	Also 9 at A.F. Station (1 native). Rest of vicinity 0.
Ninilchik, Cook Inlet	18-L	134	18	1	17	
Noatak, Bering Strait	14-E	293	286	0	286	Vicinity 0.
Nome, Bering Strait	13-H	2494(2488)	1536(1534)	18(18)	1518(1516)	
Nondalton, Cook Inlet	17-M	184	182	182	0	Vicinity 0.
Nooiksut, Arctic Slope	18-B	NA	NA	NA	NA	
Noorvik, Bering [illegible]	15-F	462	443	0	443	Vicinity [illegible].
Northeast Cape, Bering Sea	12-I	0	0	0	[illegible]	Also 1 natives and 4 other person at A.F. Station. Rest of vicinity [illegible].

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Place and Region	Census ED Map	Population				Remarks
		All Races	Total Natives	Indian	Aleut & Eskimo*	
Northway, Tanana	21-J	40	10	10	0	See note under Nabesna Village.
Nulato, Koyukuk-Lower Yukon	16-H	308	298	297	1	Vicinity 0.
Nunapitchuk, SW Coastal Lowland	14-L					See note under Kasigluk.
Ohogamiut, SW Coastal Lowland	15-K	0	0	0	0	Vicinity 0.
Old Harbor, Kodiak	18-O	290	269	1	268	
Oscarville, SW Coastal Lowland	15-L	41	38	0	38	Vicinity 0.
Ouzinkie, Kodiak	18-O	160	143	6	137	
Paradise, Koyukuk-Lower Yukon	15-J	0	0	0	0	Part of a big area with population 0.
Pauloff Harbor, Aleutian	13-R	39	38	11	27	Rest of Sanak Island 0.
Pedro Bay, Cook Inlet	17-M	65	51	47	4	Vicinity 0.
Perryville, Kodiak	15-Q	94	90	6	84	Vicinity 0.
Pilot Point, Bristol Bay	16-O	68	58	0	58	Vicinity 0.
Pilot Station, SW Coastal Lowland	14-K	290	287	1	286	Vicinity 0.
Pitkas Point, SW Coastal Lowland	14-J	70	67	0	67	Also 66 natives and 1 other person in vicinity of Pitkas Point and St. Mary's.
Platinum, SW Coastal Lowland	15-M	55	48	0	48	Also 2 in vicinity, race not given.
Point Hope, Arctic Slope	13-D	386	369	0	369	Vicinity 0.
Point Lay, Arctic Slope	14-C	0	0	0	0	Vicinity 0.
Portage Creek (Ohgsenakale), Bristol Bay	16-N	NA	NA	NA	NA	Part of a huge area with 93 natives and 8 other persons.

SUMMARY OF AVAILABLE 1970 CENSUS FIRST COUNT DATA FOR VILLAGES LISTED IN ALASKA NATIVE CLAIMS SETTLEMENT ACT

(When population in the vicinity is added to that of the village proper, the village population is shown in parentheses.) Further information in detailed listing.
(Source: 1970 Census enumeration district maps and Census first count microfilm.)

Place and Region	Census ED Map	Population				Remarks
		All Races	Total Natives	Indian	Aleut & Eskimo*	
Port Graham, Cook Inlet	18-M	107	96	0	96	
Port Heiden (Meshick), Aleutian	15-P	72(66)	59(58)	0	59(58)	Also 1 native and 8 other persons at A.F. Station.
Port Lions, Kodiak	18-O	227	184	1	183	
Quinhagak, SW Coastal Lowland	15-M	340	332	0	332	Listed as Kwinhagak in Census. Vicinity 0.
Rampart, Upper Yukon-Porcupine	18-G	36	21	9	12	Also 1 in vicinity, race not given.
Red Devil, Upper Kuskokwim	16-K	81	22	8	14	Vicinity 0.
Ruby, Koyukuk-Lower Yukon	17-H	145	134	134	0	Vicinity 2, race not given.
Russian Mission or Chauthalue (Kuskokwim), Upper Kuskokwim	15-K	100(94)	95(90)	0	95(90)	Listed as Chuathbaluk in Census.
Russian Mission (Yukon), SW Coastal Lowland	15-K	146	138	1	137	Also 1 in vicinity, race not given.
St George, Aleutian	12-P	163	156	1	155	Rest of St. George Island 0.
St Mary's, SW Coastal Lowland	14-J	384	350	13	337	Also 66 natives and 1 other person in vicinity of St. Mary's and Pitkas Point. Includes Andreafsky.
St. Michael, Bering Strait	14-I	207	192	0	192	Vicinity 0.
St. Paul, Aleutian	12-P	450	428	5	423	Rest of island 28 persons (0 natives).
Salamatof, Cook Inlet	18-L	NA	NA	NA	NA	112 natives, 2885 others in a large area around Salamatof.
Sand Point, Aleutian	14-Q	360	265	8	257	Rest of Popof Island 0.

SUMMARY OF AVAILABLE 1970 CENSUS FIRST COUNT DATA FOR VILLAGES LISTED IN ALASKA NATIVE CLAIMS SETTLEMENT ACT

(When population in the vicinity is added to that of the village proper, the village population is shown in parentheses.) Further information in detailed listing.
(Source: 1970 Census enumeration district maps and Census first count microfilm.)

Place and Region	Census ED Map	Population				Remarks
		All Races	Total Natives	Indian	Aleut & Eskimo*	
Savonoski, Bristol Bay	16-N	0	0	0	0	Vicinity 0.
Savoonga, Bering Sea	12-I	364	354	0	354	Vicinity 0.
Scammon Bay, SW Coastal Lowland	13-K	166	166	0	166	Vicinity 0.
Selawik, Bering Strait	15-F	429	418	1	417	Vicinity 0.
Seldovia, Cook Inlet	18-M	437	138	34	104	
Shageluk, Koyukuk-Lower Yukon	15-J	167	158	158	0	Vicinity 0.
Shaktoolik, Bering Strait	15-H	151	144	0	144	Vicinity 0.
Sheldon's Point, SW Coastal Lowland	14-J	125	121	0	121	Vicinity 0.
Shishmaref, Bering Strait	13-F	267	249	0	249	Also 103 persons (0 natives) in large area around Shishmaref.
Shungnak Village, Bering Strait	16-F	56	54	0	54	Vicinity 0. See also Kobuk (Shungnak city).
Slana, Cooper River	21-J	NA	NA	NA	NA	Part of huge area with 32 natives and 257 other persons.
Sleetmute, Upper Kuskokwim	16-K	109	95	0	95	Vicinity 0.
South Naknek, Bristol Bay	16-N	154	85	0	85	Vicinity 0.
Squaw Harbor, Aleutian	14-Q	65	52	0	52	Vicinity 0.
Stebbins, Bering Strait	14-I	231	223	0	223	Vicinity 0.
Stevens Village, Upper Yukon-Porcupine	19-F	74	72	72	0	Vicinity 0.
Stony River, Upper Kuskokwim	16-K	88(74)	68(61)	44(37)	24(24)	
Takotna, Upper Kuskokwim	16-J	22	9	4	5	Also 4 natives and 127 other persons at [illegible] Station. Rest of vicinity 0.

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SUMMARY OF AVAILABLE 1970 CENSUS FIRST COUNT DATA FOR VILLAGES LISTED IN ALASKA NATIVE CLAIMS SETTLEMENT ACT

(When population in the vicinity is added to that of the village proper, the village population is shown in parentheses.) Further information in detailed listing. (Source: 1970 Census enumeration district maps and Census first count microfilm.)

Place and Region	Census ED Map	Population				Remarks
		All Races	Total Natives	Indian	Aleut & Eskimo*	
Tanacross, Tanana	21-I	84	77	77	0	
Tanana, Koyukuk-Lower Yukon	18-G	411(120)	267(9)	247(4)	20(5)	An unpublished Census correction adds 11 to the total population of Tanana and vicinity (Tanana 411, vicinity 11).
Tatilek, Chugach	20-L	111	107	0	107	Listed as Tatitlek in Census.
Tazlina, Copper River	20-J	NA	NA	NA	NA	Part of a huge area with 97 natives and 427 other persons.
Telida, Upper Kuskokwim	17-I	Less than 7	0	0	0	Figures are for a large area, also including Medfra.
Teller, Bering Strait	13-G	220	192	0	192	Vicinity 0.
Tetlin, Tanana	21-I	114	108	108	0	
Togiak, Bristol Bay	15-M	383	377	0	377	Also 5 persons (all native) in a large area around Togiak.
Toksook Bay, SW Coastal Lowland	13-L	257	251	0	251	Vicinity 0.
Tulusak, SW Coastal Lowland	15-K	195	193	0	193	Vicinity 0. Tuluksak.
Tuntutuliak, SW Coastal Lowland	14-L	158	154	0	154	Vicinity [illegible].
Tununak, SW Coastal Lowland	13-L	274	270	0	270	Listed as Tanunak in Census. Vicinity 0.

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SUMMARY OF AVAILABLE 1970 CENSUS FIRST COUNT DATA FOR VILLAGES LISTED IN ALASKA NATIVE CLAIMS SETTLEMENT ACT

(When population in the vicinity is added to that of the village proper, the village population is shown in parentheses.) Further information in detailed listing.
(Source: 1970 Census enumeration district maps and Census first count microfilm.)

Place and Region	Census ED Map	Population All Races	Population Total Natives	Population Indian	Population Aleut & Eskimo*	Remarks
Twin Hills, Bristol Bay	15-M	67	66	0	66	Vicinity 0.
Tyonek, Cook Inlet	18-K	232	221	216	5	
Ugashik, Bristol Bay	16-0	21	15	0	15	Vicinity 0.
Unalakleet, Bering Strait	15-I	470(434)	419(413)	1(1)	418(402)	A.F. Station 0.
Unalaska, Aleutian	11-S	178	121	1	120	Driftwood Bay DEW Station 7 (1 native).
Unga, Aleutian	14-Q	0	0	0	0	Vicinity 0.
Uyak, Kodiak	18-0	0	0	0	0	Part of a large area with population 0.
Venetie, Upper Yukon-Porcupine	20-E	112	108	108	0	Vicinity 0.
Wainwright, Arctic Slope	15-B	326(315)	308(307)	0(0)	308(307)	
Wales, Bering Strait	13-G	131	121	0	121	Vicinity 0.
White Mountain, Bering Strait	14-H	105(87)	97(84)	0(0)	97(84)	
SOUTHEAST AREA						
Angoon	24-0	400	377	366	11	
Craig	25-Q	272	153	149	4	
Hoonah	24-N	748	539	525	14	Also large area around Hoonah with 3 natives and [illegible] other persons.
Hydaburg	25-Q	214	189	182	7	
Kake	25-P	443	406	390	16	

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SUMMARY OF AVAILABLE 1970 CENSUS FIRST COUNT DATA FOR VILLAGES LISTED IN ALASKA NATIVE CLAIMS SETTLEMENT ACT

(When population in the vicinity is added to that of the village proper, the village population is shown in parentheses.) Further information in detailed listing.
(Source: 1970 Census enumeration district maps and Census first count microfilm.)

Place and Region	Census ED Map	Population				Remarks
		All Races	Total Natives	Indian	Aleut & Eskimo*	
Kasaan	25-Q	30	8	8	0	
Klawock	25-Q	213	195	190	5	
Klukwan	23-M	103	92	91	1	Adjacent 0.
Saxman	26-Q	135	99	97	2	
Yakutat	22-M	190	157	151	6	

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* Includes also Chinese, Japanese, and Filipinos. The number of these in the native villages is probably small.

c. A NOTE ON THE PROJECTION OF SCHOOL AGE POPULATION IN SECTION 1.2.2

School age population projections in Section 1.2.2 (Tables 1-5 to 1-8) were made by standard cohort-survival techniques, modified by the assumptions regarding employment and migration set out for each alternative case. Natural increase was calculated for each year by race (Native and non-Native) for each of the geographic subdivisions of the state set out in Figure 1-1. Initial populations were 1970 census populations by age, race and census division. Mortality was based on 1967 life tables of the United States for whites and non-whites (as a proxy for non-Natives and Natives, respectively) (U.S. Department of Health, Education and Welfare, Vital Statistics of the United States, 1967). Births were calculated by geographic subdivision based upon the ratio of the number of births in 1970 (Alaska Department of Health and Welfare) to the number of females 15 to 44 in the same category in the 1970 population census by race and census division.

Labor force participation rates were calculated by geographic subdivision from the 1970 average annual employment plus unemployment by labor market area (Alaska Department of Labor, Division of Employment Security, Statistical Quarterly) against 1970 census population aged 18-64 by corresponding census division. Unemployment rates by geographic division were 1970 average annual unemployment by labor market area. Dependency rates by geographic division were from total 1970 population against employment in the corresponding labor market area.

d. SOURCE REFERENCES (SR)

1. Alaska, Department of Administration, Annual Financial Report

2. Alaska, Department of Education, Annual Report

3. Alaska, Department of Health and Welfare, Alaska Vital Statistics

4. Alaska, Department of Labor, Division of Employment Security, Statistical Quarterly

5. --- , Workforce Estimates

6. Harrison, G.S. (ed.), Alaska Public Policy. Fairbanks: University of Alaska, 1971

7. Lin, P. "Alaska's Population and School Enrollments", Alaska Review of Business and Economic Conditions. December, 1971

8. National Education Association, Estimates of School Statistics,
1969-70
1969-70

9. Tussing, A. R., Processes and Costs Imposed by Environmental Stress, paper presented at Symposium on Polar Desserts, Committee on Arid Lands, 138th Annual Meeting, American Association for the Advancement of Science, Philadelphia, December 30, 1971.

10. Tussing, A. R., G. W. Rogers, and V. Fischer, Alaska Pipeline Report, Fairbanks: University of Alaska, 1971

11. Tussing, A. R., and Thomas M., "Prices and Costs in Urban Alaska", Alaska Review of Business and Economic Conditions, September, 1971

12. U. S., Department of Commerce, Bureau of the Census, Governmental Finances in 1968-69

13. --- , Population Census of the United States, 1970, first and second counts, Alaska

14. U. S., Department of Health, Education and Welfare, Office of Education, Digest of Educational Statistics, 1970

15. U. S., Department of Health, Education and Welfare, Public Health Service, Vital Statistics of the United States, 1967

16. U. S., Department of Labor, Bureau of Labor Statistics, Autum 1971, Urban Family Budgets and Geographical Comparative Indexes, 1972.

ANNEX A-3

ALASKA NATIVE CLAIMS SETTLEMENT ACT - ABSTRACTS

(C) $70,000,000 during each of the third, fourth, and fifth fiscal years;

(D) $40,000,000 during the sixth fiscal year; and

(E) $30,000,000 during each of the next five fiscal years.

(2) Four percent interest per annum, which is authorized to be appropriated, on any amount authorized to be appropriated by this paragraph that is not appropriated within six months after the fiscal year in which payable.

(3) $500,000,000 pursuant to the revenue sharing provisions of section 9.

Fund expenditures for propaganda or political campaigns, prohibition. Penalty.

(b) None of the funds paid or distributed pursuant to this section to any of the Regional and Village Corporations established pursuant to this Act shall be expended, donated, or otherwise used for the purpose of carrying on propaganda, or intervening in (including the publishing and distributing of statements) any political campaign on behalf of any candidate for public office. Any person who willfully violates the foregoing provision shall be guilty of a misdemeanor and, upon conviction thereof, shall be fined not more than $1,000 or imprisoned not more than twelve months, or both.

Distribution.

(c) After completion of the roll prepared pursuant to section 5, all money in the Fund, except money reserved as provided in section 20 for the payment of attorney and other fees, shall be distributed at the end of each three months of the fiscal year among the Regional Corporations organized pursuant to section 7 on the basis of the relative numbers of Natives enrolled in each region. The share of a Regional Corporation that has not been organized shall be retained in the Fund until the Regional Corporation is organized.

REGIONAL CORPORATIONS

SEC. 7. (a) For purposes of this Act, the State of Alaska shall be divided by the Secretary within one year after the date of enactment at this Act into twelve geographic regions, with each region composed as far as practicable of Natives having a common heritage and sharing common interests. In the absence of good cause shown to the contrary, such regions shall approximate the areas covered by the operations of the following existing Native associations:

(1) Arctic Slope Native Association (Barrow, Point Hope);

(2) Bering Straits Association (Seward Peninsula, Unalakleet, Saint Lawrence Island);

(3) Northwest Alaska Native Association (Kotzebue);

(4) Association of Village Council Presidents (southwest coast, all villages in the Bethel area, including all villages on the Lower Yukon River and the Lower Kuskokwim River);

(5) Tanana Chiefs' Conference (Koyukuk, Middle and Upper Yukon Rivers, Upper Kuskokwim, Tanana River);

(6) Cook Inlet Association (Kenai, Tyonek, Eklutna, Iliamna);

(7) Bristol Bay Native Association (Dillingham, Upper Alaska Peninsula);

(8) Aleut League (Aleutian Islands, Pribilof Islands and that part of the Alaska Peninsula which is in the Aleut League);

(9) Chugach Native Association (Cordova, Tatitlek, Port Graham, English Bay, Valdez, and Seward);

(10) Tlingit-Haida Central Council (southeastern Alaska, including Metlakatla);

(11) Kodiak Area Native Association (all villages on and around Kodiak Island); and

(12) Copper River Native Association (Copper Center, Glennallen, Chitina, Mentasta).

Boundary disputes, arbitration.

Any dispute over the boundaries of a region or regions shall be resolved by a board of arbitrators consisting of one person selected by each of the Native associations involved, and an additional one or two persons, whichever is needed to make an odd number of arbitrators, such additional person or persons to be selected by the arbitrators selected by the Native associations involved.

Region mergers.

Limitation.

(b) The Secretary may, on request made within one year of the date of enactment of this Act, by representative and responsible leaders of the Native associations listed in subsection (a), merge two or more of the twelve regions: *Provided*, That the twelve regions may not be reduced to less than seven, and there may be no fewer than seven Regional Corporations.

Thirteenth region.

(c) If a majority of all eligible Natives eighteen years of age or older who are not permanent residents of Alaska elect, pursuant to subsection 5(c), to be enrolled in a thirteenth region for Natives who are non-residents of Alaska, the Secretary shall establish such a region for the benefit of the Natives who elected to be enrolled therein, and they may establish a Regional Corporation pursuant to this Act.

Incorporation.

(d) Five incorporators within each region, named by the Native association in the region, shall incorporate under the laws of Alaska a Regional Corporation to conduct business for profit, which shall be eligible for the benefits of this Act so long as it is organized and functions in accordance with this Act. The articles of incorporation shall include provisions necessary to carry out the terms of this Act.

(e) The original articles of incorporation and bylaws shall be approved by the Secretary before they are filed, and they shall be submitted for approval within eighteen months after the date of enactment of this Act. The articles of incorporation may not be amended during the Regional Corporation's first five years without the approval of the Secretary. The Secretary may withhold approval under this section if in his judgment inequities among Native individuals or groups of Native individuals would be created.

Management.

(f) The management of the Regional Corporation shall be vested in a board of directors, all of whom, with the exception of the initial board, shall be stockholders over the age of eighteen. The number, terms, and method of election of members of the board of directors shall be fixed in the articles of incorporation or bylaws of the Regional Corporation.

Stock, issuance.

(g) The Regional Corporation shall be authorized to issue such number of shares of common stock, divided into such classes of shares as may be specified in the articles of incorporation to reflect the provisions of this Act, as may be needed to issue one hundred shares of stock to each Native enrolled in the region pursuant to section 5.

Stockholders' rights.

(h)(1) Except as otherwise provided in paragraph (2) of this subsection, stock issued pursuant to subsection (g) shall carry a right to vote in elections for the board of directors and on such other questions as properly may be presented to stockholders, shall permit the holder to receive dividends or other distributions from the Regional Corporation, and shall vest in the holder all rights of a stockholder in a business corporation organized under the laws of the State of Alaska, except that for a period of twenty years after the date of enactment of this Act the stock, inchoate rights thereto, and any dividends paid or distributions made with respect thereto may not be sold, pledged, subjected to a lien or judgment execution, assigned in present or future, or otherwise alienated: *Provided*, That such limitation shall not apply to transfers of stock pursuant to a court decree of separation, divorce or child support.

National Wildlife Refuge lands.

in order of their proximity to the center of the Native village: *Provided*, That if the Secretary, pursuant to section 17, and 22(e) determines there is a need to expand the boundaries of a National Wildlife Refuge to replace any acreage selected in the Wildlife Refuge System by the Village Corporation the withdrawal under this section shall not include lands in the Refuge.

(B) The Secretary shall make the withdrawal provided for in subsection (3)(A) hereof on the basis of the best available information within sixty days of the date of enactment of this Act, or as soon thereafter as practicable.

(b)(1) The Native villages subject to this Act are as follows:

NAME OF PLACE AND REGION

Afognak, Afognak Island.
Akhiok, Kodiak.
Akiachak, Southwest Coastal Lowland.
Akiak, Southwest Coastal Lowland.
Akutan, Aleutian.
Alakanuk, Southwest Coastal Lowland.
Alatna, Koyukuk-Lower Yukon.
Aleknagik, Bristol Bay.
Allakaket, Koyukuk-Lower Yukon.
Ambler, Bering Strait.
Anaktuvuk, Pass, Arctic Slope.
Andreafsey, Southwest Coastal Lowland.
Aniak, Southwest Coastal Lowland.
Anvik, Koyukuk-Lower Yukon.
Arctic Village, Upper Yukon-Porcupine.
Atka, Aleutian.
Atkasook, Arctic Slope.
Atmautluak, Southwest Coastal Lowland.
Barrow, Arctic Slope.
Beaver, Upper Yukon-Porcupine.
Belkofsky, Aleutian.
Bethel, Southwest Coastal Lowland.
Bill Moore's, Southwest Coastal Lowland.
Biorka, Aleutian.
Birch Creek, Upper Yukon-Porcupine.
Brevig Mission, Bering Strait.
Buckland, Bering Strait.
Candle, Bering Strait.
Cantwell, Tanana.
Canyon Village, Upper Yukon-Porcupine.
Chalkyitsik, Upper Yukon-Porcupine.
Chanilut, Southwest Coastal Lowland.
Cherfornak, Southwest Coastal Lowland.
Chevak, Southwest Coastal Lowland.
Chignik, Kodiak.
Chignik Lagoon, Kodiak.
Chignik Lake, Kodiak.
Chistochina, Copper River.
Chitina, Copper River.
Chukwuktoligamute, Southwest Coastal Lowland.
Circle, Upper Yukon-Porcupine.
Clark's Point, Bristol Bay.
Copper Center, Copper River.
Crooked Creek, Upper Kuskokwim.
Deering, Bering Strait.

Dillingham, Bristol Bay.
Dot Lake, Tanana.
Eagle, Upper Yukon-Porcupine.
Eek, Southwest Coastal Lowland.
Egegik, Bristol Bay.
Eklutna, Cook Inlet.
Ekuk, Bristol Bay.
Ekwok, Bristol Bay.
Elim, Bering Strait.
Emmonak, Southwest Coastal Lowland.
English Bay, Cook Inlet.
False Pass, Aleutian.
Fort Yukon, Upper Yukon-Porcupine.
Gakona, Copper River.
Galena, Koyukuk-Lower Yukon.
Gambell, Bering Sea.
Georgetown, Upper Kuskokwim.
Golovin, Bering Strait.
Goodnews Bay, Southwest Coastal Lowland.
Grayling, Koyukuk-Lower Yukon.
Gulkana, Copper River.
Hamilton, Southwest Coastal Lowland.
Holy Cross, Koyukuk-Lower Yukon.
Hooper Bay, Southwest Coastal Lowland.
Hughes, Koyukuk-Lower Yukon.
Huslia, Koyukuk-Lower Yukon.
Igiugig, Bristol Bay.
Iliamna, Cook Inlet.
Inalik, Bering Strait.
Ivanof Bay, Aleutian.
Kaguyak, Kodiak.
Kaktovik, Arctic Slope.
Kalskag, Southwest Coastal Lowland.
Kaltag, Koyukuk-Lower Yukon.
Karluk, Kodiak.
Kasigluk, Southwest Coastal Lowland.
Kiana, Bering Strait.
King Cove, Aleutian.
Kipnuk, Southeast Coastal Lowland.
Kivalina, Bering Strait.
Kobuk, Bering Strait.
Kokhanok, Bristol Bay.
Koliganek, Bristol Bay.
Kongiganak, Southwest Coastal Lowland.
Kotlik, Southwest Coastal Lowland.
Kotzebue, Bering Strait.
Koyuk, Bering Strait.
Koyukuk, Koyukuk-Lower Yukon.
Kwethluk, Southwest Coastal Lowland.
Kwigillingok, Southwest Coastal Lowland.
Larsen Bay, Kodiak.
Levelock, Bristol Bay.
Lime Village, Upper Kuskokwim.
Lower Kalskag, Southwest Coastal Lowland.
McGrath, Upper Kuskokwim.
Makok, Koyukuk-Lower Yukon.
Manley Hot Springs, Tanana.
Manokotak, Bristol Bay.
Marshall, Southwest Coastal Lowland.

Mary's Igloo, Bering Strait.
Medfra, Upper Kuskokwim.
Mekoryuk, Southwest Coastal Lowland.
Mentasta Lake, Copper River.
Minchumina Lake, Upper Kuskokwim.
Minto, Tanana.
Mountain Village, Southwest Coastal Lowland.
Nabesna Village, Tanana.
Naknek, Bristol Bay.
Napaimute, Upper Kuskokwim.
Napakiak, Southwest Coastal Lowland.
Napaskiak, Southwest Coastal Lowland.
Nelson Lagoon, Aleutian.
Nenana, Tanana.
Newhalen, Cook Inlet.
New Stuyahok, Bristol Bay.
Newtok, Southwest Coastal Lowland.
Nightmute, Southwest Coastal Lowland.
Nikolai, Upper Kuskokwim.
Nikolski, Aleutian.
Ninilchik, Cook Inlet.
Noatak, Bering Strait.
Nome, Bering Strait.
Nondalton, Cook Inlet.
Nooiksut, Arctic Slope.
Noorvik, Bering Strait.
Northeast Cape, Bering Sea.
Northway, Tanana.
Nulato, Koyukuk-Lower Yukon.
Nunapitchuk, Southwest Coastal Lowland.
Ohogamiut, Southwest Coastal Lowland.
Old Harbor, Kodiak.
Oscarville, Southwest Coastal Lowland.
Ouzinkie, Kodiak.
Paradise, Koyukuk-Lower Yukon.
Pauloff Harbor, Aleutian.
Pedro Bay, Cook Inlet.
Perryville, Kodiak.
Pilot Point, Bristol Bay.
Pilot Station, Southwest Coastal Lowland.
Pitkas Point, Southwest Coastal Lowland.
Platinum, Southwest Coastal Lowland.
Point Hope, Arctic Slope.
Point Lay, Arctic Slope.
Portage Creek (Ohgsenakale), Bristol Bay.
Port Graham, Cook Inlet.
Port Heiden (Meshick), Aleutian.
Port Lions, Kodiak.
Quinhagak, Southwest Coastal Lowland.
Rampart, Upper Yukon-Porcupine.
Red Devil, Upper Kuskokwim.
Ruby, Koyukuk-Lower Yukon.
Russian Mission or Chauthalue (Kuskokwim), Upper Kuskokwim.
Russian Mission (Yukon), Southwest Coastal Lowland.
St. George, Aleutian.
St. Mary's, Southwest Coastal Lowland.
St. Michael, Bering Strait.
St. Paul, Aleutian.

Salamatof, Cook Inlet.
Sand Point, Aleutian.
Savonoski, Bristol Bay.
Savoonga, Bering Sea.
Scammon Bay, Southwest Coastal Lowland.
Selawik, Bering Strait.
Seldovia, Cook Inlet.
Shageluk, Koyukuk-Lower Yukon.
Shaktoolik, Bering Strait.
Sheldon's Point, Southwest Coastal Lowland.
Shishmaref, Bering Strait.
Shungnak, Bering Strait.
Slana, Copper River.
Sleetmute, Upper Kuskokwim.
South Naknek, Bristol Bay.
Squaw Harbor, Aleutian.
Stebbins, Bering Strait.
Stevens Village, Upper Yukon-Porcupine.
Stony River, Upper Kuskokwim.
Takotna, Upper Kuskokwim.
Tanacross, Tanana.
Tanana, Koyukuk-Lower Yukon.
Tatilek, Chugach.
Tazlina, Copper River.
Telida, Upper Kuskokwim.
Teller, Bering Strait.
Tetlin, Tanana.
Togiak, Bristol Bay.
Toksook Bay, Southwest Coastal Lowland.
Tulusak, Southwest Coastal Lowland.
Tuntutuliak, Southwest Coastal Lowland.
Tununak, Southwest Coastal Lowland.
Twin Hills, Bristol Bay.
Tyonek, Cook Inlet.
Ugashik, Bristol Bay.
Unalakleet, Bering Strait.
Unalaska, Aleutian.
Unga, Aleutian.
Uyak, Kodiak.
Venetie, Upper Yukon-Porcupine.
Wainwright, Arctic Slope.
Wales, Bering Strait.
White Mountain, Bering Strait.

Review.

(2) Within two and one-half years from the date of enactment of this Act, the Secretary shall review all of the villages listed in subsection (b) (1) hereof, and a village shall not be eligible for land benefits under subsections 14 (a) and (b), and any withdrawal for such village shall expire, if the Secretary determines that—

(A) less than twenty-five Natives were residents of the village on the 1970 census enumeration date as shown by the census or other evidence satisfactory to the Secretary, who shall make findings of fact in each instance; or,

(B) the village is of a modern and urban character, and the majority of the residents are non-Native.

Any Native group made ineligible by this subsection shall be considered under subsection 14(h).

(3) Native villages not listed in subsection (b) (1) hereof shall be eligible for land and benefits under this Act and lands shall be withdrawn pursuant to this section if the Secretary within two and one-

TABLE III-1 CLIMATE AND COSTS: SELECTED ALASKA AND OTHER UNITED STATES CITIES

	Heating Degree Days, Normal Year [2]	Mean Daily Minimum, Coldest Month [3]	January Wind chill Index (Kg.cal./m² hr.) [4]	Cost of Family Consumption Moderate Income (U.S. = 100) [5]		Family Housing Cost Moderate Income (U.S. = 100) [5]		Median Contract Rent per room (U.S.=100) [6]	Construction Cost Index (Seattle=100) [7]
				1967	1970	1967	1970	1970	1971
BARROW	20,174	-31.0°C	1650					198	350
FAIRBANKS	14,279	-29.6	1110	149	145	175	177	273	190
ANCHORAGE	10,648	-18.3	1040	137	132	163	160	213	170
Duluth	10,000	-18.1							
JUNEAU	9,075	-15.3	970	144	141	172	173	207	180
Minneapolis	8,382	-16.5		100	99	104	98		
Milwaukee	7,635	-10.6		102	103	110	116		
Portland, Me.	7,511	-11.2		103	103	99	98		
SITKA	7,464	- 1.7						126	180
KETCHIKAN	7,069	- 0.9	940	134	132	153	157	168	
Buffalo	7,062	- 7.6		105	106	104	108		
Seattle	5,145	0.5		107	105	104	104		100
New York	4,871	- 2.8		109	112	118	123		
Los Angeles	1,799	7.2		102	101	98	99		
Honolulu	0	18.7		116	115	128	123		

Adapted and updated from A.R. Tussing, "Alaska Regional Inflation: An Overview of the Problem from the Standpoint of the Federal Government", in Federal Field Committee for Development Planning In Alaska, Studies on Alaska Regional Inflation. Anchorage 1969.

1) Climate data are for Annette, Alaska.
2) Source: U.S. Weather Service station summaries. Sum of deficiency in daily mean Fahrenheit temperatures below 65° F.
3) Source: U.S. Weather Service station summaries.
4) Philip R. Johnson and Charles W. Hartman, Environmental Atlas of Alaska

Notes to table III-1 (continued):
University of Alaska, 1969.
5) A.R. Tussing and Monica Thomas, "Prices and Costs of Living in Urban Alaska", Alaska Review of Business and Economic Conditions, 1971. Prices linked at Anchorage.
6) Tussing and Thomas (op.cit., from U.S. Census of Housing figures, linked at Anchroage to U.S. Department of Labor, Bureau of Labor Statistics moderate income family rental cost index.
7) Source: U.S. Army Corps of Engineers, Construction Cost Index for Alaska, August, 1971.

TABLE III-2 BUREAU OF INDIAN AFFAIRS, Budget for

State of ALASKA

Appropriation and Activity	Actual F.Y. 1971	Estimate F.Y. 1972	Estimate F.Y. 1973
EDUCATION AND WELFARE SERVICES:			
Educational assistance, facilities and services..........	16,082,447	17,709,000	19,477,000
Adult education..........	67,443	62,900	65,000
Welfare and guidance services..........	5,690,266	6,149,000	6,140,000
Relocation and adult vocational training....	1,923,916	2,100,000	3,059,000
Maintaining law and order..........	- -	- -	- -
Total..........	23,764,072	26,020,900	28,741,000
RESOURCES MANAGEMENT:			
Forest and range lands..........	74,207	75,000	81,000
Fire suppression..........	133	- -	- -
Outdoor recreation..........	- -	- -	- -
Agricultural and industrial assistance......	888,688	907,000	1,247,000
Soil and moisture conservation..........	- -	- -	- -
Maintenance of roads..........	58,793	59,000	100,000
Development of Indian arts and crafts.......	29,100	18,500	19,500
Management of Indian trust property.........	177,953	210,000	250,000
Repair and maintenance of buildings and utilities..........	2,686,810	3,562,000	3,527,000
Operation, repair and maintenance of Indian irrigation systems..........	- -	- -	- -
Indian business development fund..........	257,341	- -	- -
Environmental quality services..........	- -	- -	63,000
Total..........	4,173,025	4,831,500	5,287,500
CONSTRUCTION: 1/			
Buildings and utilities..........	4,816,410	3,881,590	9,262,900
Irrigation systems..........	- -	- -	- -
Total..........	4,816,410	3,881,590	9,262,900
ROAD CONSTRUCTION (LIQ. OF CON. AUTH.): 1/			
Federal-Aid Highway roads..........	1,013,087	1,000,000	1,413,000
GENERAL ADMINISTRATIVE EXPENSES:..........	471,000	490,000	500,000
GRAND TOTAL..........	34,237,594	36,223,990	45,204,400

1/ See attached statement for project distribution.

APPENDIX TABLE III-2
(continued)

BUREAU OF INDIAN AFFAIRS

State of Alaska

GRANTS

Appropriation and Activity	Actual F.Y. 1971	Estimate F.Y. 1972	Estimate F.Y. 1973
EDUCATION AND WELFARE SERVICES:			
Educational assistance, facilities and services..........	3,505,000	3,228,000	3,700,000
Adult education..........................	20,000		
Welfare and guidance services................			
Relocation and adult vocational training....			
Maintaining law and order.................			
Total............................	3,525,000	3,228,000	3,700,000
RESOURCES MANAGEMENT:			
Forest and range lands.....................			
Fire suppression.........................			
Outdoor recreation........................			
Agricultural and industrial assistance......	10,000	30,000	30,000
Soil and moisture conservation.............			
Maintenance of roads......................			
Development of Indian arts and crafts.......			
Management of Indian trust property.........			
Repair and maintenance of buildings and utilities................................			
Operation, repair and maintenance of Indian irrigation systems.................			
Indian business development fund...........			
Environmental quality services.............			
Total............................	10,000	30,000	30,000
CONSTRUCTION: 1/			
Buildings and utilities....................			
Irrigation systems........................			
Total............................			
ROAD CONSTRUCTION (LIQ. OF CON. AUTH.): 1/			
Federal-Aid Highway roads..................			
GENERAL ADMINISTRATIVE EXPENSES:............			
GRAND TOTAL.......................	3,535,000	3,258,000	3,730,000

1/ See attached statement for project distribution.

APPENDIX TABLE III-2
(continued)

DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

State of ALASKA

	Actual F. Y. 1971	Program F. Y. 1972	Estimate F. Y. 1973
CONSTRUCTION:			
Buildings and Utilities:			
Specific projects..........................			
FWPCA Program	38,708		
Kodiak Dormitory Facilities	2,328		
Togiak School	351,971		
Tyonek School	167,531		
Kindergarten Classrooms	511,166	1,354,590	349,300
Bethel Dormitory	2,461,789	68,000	
Chevak School Addition	8,222		
Hooper Bay Sewage Disposal	77,620		
Kipnuk School	1,480		
(Continued see attached)			
Major alterations and improvements.........	489,059	1,301,000	1,366,600
Advance planning...........................		73,200	149,000
Quarters, various..........................			
Water exploration and development..........	6,948		10,000
Total, buildings and utilities...	4,816,410	3,881,590	9,262,900
Irrigation Systems:			
Total, irrigation systems........	4,816,410	3,881,590	9,262,900
Total, Construction..............			
ROAD CONSTRUCTION (LIQ. OF CONTRACT AUTH):			
Federal-Aid Highway Roads:			
Juneau Area Office	268,218	430,000	- - -
Anchorage Agency	37,822	130,000	488,000
Fairbanks Agency	422,020	217,000	500,000
Southeast Agency	285,027	223,000	425,000
Total, Federal-Aid Highway Roads.	1,013,087	1,000,000	1,413,000

APPENDIX TABLE III-2
(continued)

DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

State of ALASKA

	Actual F. Y. 1971	Program F. Y. 1972	Estimate F. Y. 1973
CONSTRUCTION:			
Buildings and Utilities:			
Specific projects - continued:			
Quinhagak School	10,264		
Barrow Classroom and Quarters	38,335		
Wainwright School	13,462		
Mt. Edgecumbe Rehabilitation	73,762		
Kotzebue Classroom and Quarters	9,699		
Kotzebue School Addition	537,049		
Savoonga School	1,257		
Shishmaref Classroom Addition	3,582		
Deferred Equipment	12,178		38,000
Kotzebue Water Sewer		399,000	
Barrow School Design Drawings		225,000	
Alaska Dormitories Design Drawings		460,800	
Regional Dormitories Tok, Ft.Yukon, Dillinghan			4,900,000
Fairbanks Dormitory			1,250,000
Napaskiak Day School			1,200,000

TABLE III-3b STATE OF ALASKA DEPARTMENT OF EDUCATION, APPROPRIATIONS AND EXPENDITURES, FISCAL 1970

GENERAL FUND
Statement of Expenditures and Encumbrances
Compared with Authorizations
Fiscal Year Ended June 30, 1970

	1969-70 Budget Act Appropriations	Revisions Continuations Increases	Total Appropriations	Expenditures	Encumbrances at close of Year	Unencumbered Balance	
						Continuing Program	Lapsed
DEPARTMENT OF EDUCATION							
General Administration	$ 476,500	$ 45,000	$ 521,500	$ 355,444	$ 39,730	$	$ 126,324
Administrative Services	1,069,500		1,069,500	916,408	86,621		66,469
Instructional Services	4,082,100	486,919	4,569,019	2,879,408	1,245,445		444,165
State Operated School	19,588,500	833,444	20,421,944	16,411,679	3,444,923		565,342
District School Support	40,737,900	2,571,452	43,309,352	41,056,770	2,238,988		13,593
Vocational Education	2,241,300	871,016	3,112,316	1,334,897	1,089,848		687,570
State Libraries	369,500	143,300	512,800	235,429	270,427		6,942
Vocational Rehabilitation	1,540,300	111,259	1,651,559	1,446,815	124,658		80,085
Total Department of Education	$70,105,600	$5,062,392	$75,167,992	$64,636,853	$8,540,643	$	$1,990,495
UNIVERSITY OF ALASKA							
Grants to the School	$11,876,000	$	$11,876,000	$11,876,000	$	$	$
Total - Education	$81,981,600	$5,062,392	$87,043,992	$76,512,853	$8,540,643	$	$1,990,49

Source: State of Alaska, Department of Administration, Annual Financial Report

TABLE III-3a STATE OF ALASKA DEPARTMENT OF EDUCATION, APPROPRIATIONS AND EXPENDITURES, FISCAL 1971

Fiscal Year Ended June 30, 1971

	Appropriations				Encumbrances at Close of Year	Balances	
	1970-71 Budget Act	Continuations and Revisions	Total	Expenditures		Continuing Program	Lapsed
DEPARTMENT OF EDUCATION							
General Administration	$ 689,600	$ 1,085,729	$ 1,775,329	$ 1,449,344	$ 230,098	$	$ 95,885
Administrative Services	4,654,200	534,371	5,188,571	2,008,479	2,580,793		599,299
Instructional Services	646,300	77,319	723,619	566,975	79,982		76,661
State Operated School	29,374,300	983,593	30,357,893	23,781,092	5,340,195		1,236,604
District School Support	76,892,000	367,900	77,259,900	72,970,659	3,955,629		333,611
Vocational Education	4,759,200	299,310	5,058,510	3,233,825	872,693		951,991
Regional Schools	2,961,400	298,741	3,260,141	2,727,314	343,012		189,814
State Libraries	780,500	93,912	874,412	423,671	443,590		7,149
Vocational Rehabilitation	2,804,500	271,200	3,075,700	1,815,767	115,912	144,618	999,402
Total Department of Education	$123,562,000	$ 4,012,076	$127,574,076	$103,977,129	$13,961,908	$ 144,618	$ 4,490,421
UNIVERSITY OF ALASKA							
Grants to the School	$ 17,000,000	$	$ 17,000,000	$ 17,000,000	$	$	$
Total Education	$140,562,000	$ 4,012,076	$144,574,076	$125,977,129	$13,961,908	$ 144,618	$ 4,490,421

Source: State of Alaska, Department of Administration, Annual Financial Report

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TABLE III-3c

STATE OF ALASKA

GENERAL FUND
Statement of Expenditures and Encumbrances
Compared with Authorizations
Fiscal Year Ended June 30, 1969

	1968-69 Budget Act Appropriations	Revisions Continuations Increases	Total Appropriations	Expenditures	Encumbrances at close of Year	Unencumbered balance	
						Continuing Program	Lapsed
EDUCATION							
DEPARTMENT OF EDUCATION							
General Administration	$ 210,600.00	$ 189,580.00	$ 400,180.00	$ 232,477.98	$ 56,213.07	$	$111,488.95
Administrative Services	$ 799,400.00	$ 234,477.86	$ 1,033,877.86	$ 745,547.47	$ 113,670.08	$	$174,660.31
Instructional Services	$ 1,484,900.00	$ 1,469,066.01	$ 2,953,966.01	$ 1,220,861.69	$1,561,203.31	$	$171,901.01
State Operated Schools							
Administration	$ 120,000.00	$ 310,866.00	$ 430,866.00	$ 400,845.36	$ 20,419.46	$	$ 9,601.18
Rural Schools	6,054,100.00	1,297,297.91	7,351,397.91	5,473,760.47	1,848,104.59		29,532.85
On Base Schools	7,202,000.00	894,067.39	8,096,067.39	6,677,516.32	1,181,246.03		237,305.04
Regional Schools	773,500.00	59,566.00	833,066.00	644,548.94	160,273.92		28,243.14
Federal Program	1,200,000.00	119,996.29	1,319,996.29	680,293.42	500,728.25		138,974.62
Boarding Home		600,900.00	600,900.00	510,761.51	28,546.91		61,591.58
Sub-Total	$ 15,349,600.00	$ 3,282,693.59	$ 18,632,293.59	$14,387,726.02	$3,739,319.16	$	$505,248.41
District School Support							
School Foundation Program	$ 23,843,000.00	$ 2,449,300.00	$ 26,292,300.00	$25,192,994.75	$1,099,305.25	$	$
Pupil Transportation	2,547,000.00	237,100.00	2,784,100.00	2,541,828.65	242,271.35		
State Share Teacher Retirement	1,040,000.00		1,040,000.00	164,348.65	875,651.35		
Non Resident Tuition	759,000.00	428,500.00	1,187,500.00	911,892.30	275,607.70		
Johnson O'Malley, Juvenile, and Sabbatical Leave	295,000.00	12,424.67	307,424.67	142,897.53	164,344.15		182.99
Sub-Total	$ 28,484,000.00	$ 3,127,324.67	$ 31,611,324.67	$28,953,961.88	$2,657,179.80	$	$ 182.99
Vocational Education	$ 1,616,000.00	$ 111,632.37	$ 1,727,632.37	$ 491,108.07	$1,140,050.61	$	$ 96,473.69
State Libraries	$ 407,400.00	$ 3,803.37	$ 411,203.37	$ 318,086.92	$ 31,031.77	$	$ 62,084.68
Vocational Rehabilitation	$ 1,135,700.00	$ 323,300.00	$ 1,459,000.00	$ 1,186,920.37	$ 113,396.60	$	$158,683.03
Teacher Salary Increase	$ 2,758,000.00	$ (2,758,000.00)	$	$	$	$	$
Total Department of Education	$ 52,245,600.00	$ 5,983,877.87	$ 58,229,477.87	$47,536,690.40	$9,412,064.40	$	$1,280,723.07
UNIVERSITY OF ALASKA							
Grants to the school	$ 10,400,500.00	$	$ 10,400,500.00	$10,400,500.00	$	$	$
Total Education	$ 62,646,100.00	$ 5,983,877.87	$ 68,629,977.87	$57,937,190.40	$9,412,064.40	$	$1,280,723.07

TABLE III-3d

Operating Programs	1967-68 Appropriations Including Revisions	For Encumbrances Outstanding 7/1/67 Including Revisions	Total Appropriations	Expenditures	Unexpended Balance	Encumbrances at Close of Year	Unencumb Continuing Program	lances Lapsed
DEPARTMENT OF EDUCATION								
General Administration								
Administration	$ 597,700.00	$ 29,381.45	$ 627,081.45	$ 581,808.04	$ 45,273.41	$ 13,119.35	$	$ 32,154.06
Board of Education	14,000.00	65.67	14,065.67	7,690.81	6,374.86	86.70		6,288.16
Advisory Commission	91,612.00	21,263.58	112,875.58	66,856.27	46,019.31	22,791.93		23,227.38
NDEA Title X	113,300.00	22,756.84	136,056.84	55,542.36	80,514.48	11,873.07		68,641.41
PL 89-10 Title V		42,517.84	42,517.84	9.95	42,507.89		42,507.89	
Sub-Total	$ 816,612.00	$ 115,985.38	$ 932,597.38	$ 711,907.43	$ 220,689.95	$ 47,871.05	$ 42,507.89	$ 130,311.01
District School Support								
School Foundation Program	$ 20,575,000.00	$ 653,951.00	$ 21,228,951.00	$ 20,803,536.75	$ 425,414.25	$ 425,414.25	$	$
Pupil Transportation	2,365,200.00	203,042.00	2,568,242.00	2,219,592.90	348,649.10	248,444.28		100,204.82
State Share Teachers Retirement	825,600.00	368,741.27	1,194,341.27	798,419.52	395,921.75	359,921.75		36,000.00
Pupil Tuition-Non Resident	516,000.00	126,949.00	642,949.00	616,090.50	26,858.50	26,858.50		
Johnson O'Malley Aid	273,500.00	432.00	273,932.00	192,759.35	81,172.65			81,172.65
Sub-Total	$ 24,555,300.00	$ 1,353,115.27	$ 25,908,415.27	$ 24,630,399.02	$ 1,278,016.25	$ 1,060,638.78	$	$ 217,377.47
State Operated Schools								
Administration	$ 79,490.23	$ 133,335.05	$ 212,825.28	$ 199,131.09	$ 13,694.19	$	$	$ 13,694.19
Rural Schools	6,404,200.00	1,495,229.07	7,899,429.07	6,419,780.96	1,479,648.11	952,895.30		526,752.81
On Base Schools	6,800,379.30	1,051,348.51	7,851,727.81	6,736,605.11	1,115,122.70	1,086,584.74		28,537.96

Operating Programs	Authorizations						Unencumbered Balances	
	1967-68 Appropriations Including Revisions	Reappropriated For Encumbrances Outstanding 7/1/67 Including Revisions	Total Appropriations	Expenditures	Unexpended Balance	Encumbrances at Close of Year	Continuing Program	Lapsed
State Operated Schools - Continued								
Regional Schools	$ 677,800.00	$ 98,127.95	$ 775,927.95	$ 694,282.90	$ 81,645.05	$ 71,789.10	$	$ 9,855.95
Sub-Totals	$13,961,869.53	$ 2,778,040.58	$16,739,910.11	$ 14,049,800.06	$ 2,690,110.05	$ 2,111,269.14	$	$ 578,841.91
School Services								
School Lunch and Milk	$ 259,100.00	$ 40,041.52	$ 299,141.52	$ 268,829.32	$ 30,312.20	$ 1,246.28	$	$ 29,065.92
NDEA Title III	204,131.00	98,875.57	303,006.57	170,989.48	132,017.09	129,612.18		2,404.91
NDEA Title V	80,000.00	40,375.36	120,375.36	70,558.39	49,816.97	47,306.11		2,510.86
Correspondence Courses	76,700.00	6,981.29	83,681.29	56,165.86	27,515.43	6,091.59		21,423.84
Sabbatical Leave	37,900.00	18,867.44	56,767.44	32,643.78	24,123.66	24,123.66		
Sub-Totals	$ 657,831.00	$ 205,141.18	$ 862,972.18	$ 599,186.83	$ 263,785.35	$ 208,379.82	$	$ 55,405.53
Vocational Education								
George Barden	$	$ 214,615.14	$ 214,615.14	$ 214,615.14	$	$	$	$
Public Law 88-210	760,700.00	280,314.94	1,041,014.94	396,376.93	644,638.01	575,763.49		68,874.52
Manpower Development and Training Act	912,900.00	160,473.80	1,073,373.80	481,862.45	591,511.35	337,870.33		253,641.02
Sub-Totals	$ 1,673,600.00	$ 655,403.88	$ 2,329,003.88	$ 1,092,854.52	$ 1,236,149.36	$ 913,633.82	$	$ 322,515.54
Special School Programs								
Education for the Handicapped	$ 30,000.00	$ 630.37	$ 30,630.37	$ 4,991.87	$ 25,638.50	$	$	$ 25,638.50
Ford Foundation Grant		9,128.50	9,128.50	4,585.66	4,542.84			4,542.84
Teachers Training - Handicapped Children	199,732.00	24,367.45	224,099.45	51,415.15	172,684.30		$ 172,684.30	
Citizenship Night School	600.00		600.00		600.00			600.00
Juveniles in Detention	15,000.00	11,107.25	26,107.25	16,454.06	9,653.19	7,259.67		2,393.52
Economic Opportunity Act	141,600.00	38,506.91	180,106.91	99,347.99	80,758.92	63,584.85		17,174.07
PL 89-10 Title I and III	790,100.00	267,409.58	1,057,509.58	953,359.04	104,150.54	38,893.25		65,257.29
PL 89-10 Title I		176,140.94	176,140.94	3,047.16	173,093.78			173,093.78
Sub-Totals	$ 1,177,032.00	$ 527,291.00	$ 1,704,323.00	$ 1,133,200.93	$ 571,122.07	$ 109,737.77	$ 172,684.30	$ 288,700.00
Library and Museum								
State Library Service	$ 219,185.00	$ 9,051.97	$ 228,236.97	$ 182,645.25	$ 45,591.72	$ 33,107.04	$	$ 12,484.68
Library Construction Grant	97,342.00	181,635.00	278,977.00	87,657.00	191,320.00	25,136.17		166,183.83
Library Planning Title III	101,919.00	10,859.25	112,778.25	11,459.25	101,319.00	75,212.08		26,106.92
Art Council PL 89-209	3,325.11	2,343.62	5,668.73	3,781.44	1,887.29	1,887.29		
State Historical Museum	53,650.00	5,445.08	59,095.08	54,083.22	5,011.85	5,011.85		
Sub-Totals	$ 475,421.11	$ 209,334.92	$ 684,756.03	$ 339,626.16	$ 345,129.87	$ 140,354.43	$	$ 204,775.43
Vocational Rehabilitation								
Support Programs	$ 544,255.00	$ 31,256.60	$ 575,511.60	$ 501,303.22	$ 74,208.38	$ 59,503.86	$	$ 14,704.52
Training and Planning Grants	246,288.00	818.30	247,106.30	145,452.85	101,653.45	20,459.75		81,193.70
Facilities and Workshops	29,007.00	2,996.71	32,003.71	14,872.56	17,131.15	1,163.49		15,967.66
Social Security Act Program	25,000.00		25,000.00	19,733.41	5,266.59	371.25		4,895.34
Disability Determination	37,850.00	862.63	38,712.63	39,444.14	(731.51)			(731.51)
Small Business Enterprise	4,000.00		4,000.00	3,380.40	619.60			619.60
Research and Demonstration	184,900.00	15,885.42	200,785.42	126,390.88	74,395.54			74,395.54
Sub-Totals	$ 1,071,300.00	$ 51,820.65	$ 1,123,120.65	$ 850,577.45	$ 272,543.20	$ 81,498.35	$	$ 191,044.85
Department Total	$44,388,965.64	$ 5,896,132.87	$50,285,098.51	$ 43,407,552.41	$ 6,877,546.10	$ 4,673,382.17	$ 215,192.19	$ 1,988,971.74
UNIVERSITY OF ALASKA								
Administration and Operation	$ 8,618,900.00	$	$ 8,618,900.00	$ 8,615,900.00	$	$	$	$
Total - Education	$53,007,865.64	$ 5,896,132.87	$58,903,998.51	$ 52,023,452.41	$ 6,877,546.10	$ 4,673,382.17	$ 215,192.19	$ 1,988,971.74

STATE OF ALASKA

TABLE III-3e

GENERAL FUND
Statement of Expenditures and Encumbrances
Compared with Authorizations
For Fiscal Year Ended June 30, 1967

DEPARTMENT OF EDUCATION	Authorizations: 1966-67 Appropriations Including Revisions	Authorizations: Reappropriated For Encumbrances Outstanding 7/1/66 Including Revisions	Total Appropriations	Expenditures	Unexpended Balance*	Encumbrances at Close of Year	Unencumbered Balances: Continuing Programs	Unencumbered Balances: Lapsed
General Administration								
Administration and Board of Education	$ 538,000.00	$ 21,332.95	$ 559,332.95	$ 488,044.60	$ 71,288.35	$ 29,621.92	$	$ 41,666.43
Advisory Commission	60,900.00	430.85	61,330.85	28,615.07	32,715.78	24,500.04		8,215.74
NDEA Title X	139,100.00	2,833.75	141,933.75	116,469.34	25,464.41	22,756.84		2,707.57
High School Study	25,000.00		25,000.00	24,968.97	31.03			31.03
PL 8910 Title V		61,656.54	61,656.54	19,138.70	42,517.84		42,517.84	
Sub-Total	$ 763,000.00	$ 86,254.09	$ 849,254.09	$ 677,236.68	$ 172,017.41	$ 76,878.80	$ 42,517.84	$ 52,620.77
District School Support								
School Foundation Program	$ 19,435,000.00	$ 561,121.00	$ 19,996,121.00	$ 19,354,062.15	$ 642,058.85	$ 635,951.00	$	$ 6,107.85
Pupil Transportation	2,148,400.00	212,886.04	2,361,286.04	2,088,945.77	272,340.27	144,353.22		127,987.05
State Share Teachers Retirement	$ 745,000.00	$ 282,309.56	$ 1,027,309.56	$ 658,568.39	$ 368,741.27	$ 368,741.27	$	$
Tuition, Nonresident	516,000.00	249,717.00	765,717.00	579,941.00	185,776.00	130,925.00		54,851.00
Johnson O'Malley Aid	175,500.00	315.39	175,815.39	160,889.91	14,925.48	432.00		14,493.48
Sub-Total	$ 23,019,900.00	$ 1,306,349.29	$ 24,326,249.29	$ 22,842,407.42	$ 1,483,841.87	$ 1,280,402.49	$	$ 203,439.38
State Operated Schools								
Administration	$ 877,262.00	$	$ 877,262.00	$ 569,928.91	$ 307,333.09	$ 143,120.87	$	$ 164,212.22
Rural and Regional Schools	5,349,638.00	307,655.61	5,657,293.61	4,042,233.97	1,615,059.64	1,461,468.30		153,591.34
On Base Schools	6,494,100.00	418,206.59	6,912,306.59	5,671,527.06	1,240,779.83	1,051,348.51		189,431.32
Johnson O'Malley Schools	454,400.00	34,445.65	488,845.65	336,233.88	152,611.77	131,643.30		20,968.47
Fish and Wildlife Schools	128,100.00	4,876.33	132,976.33	111,789.76	21,186.57	18,157.70		3,028.87
Sub-Total	$ 13,303,500.00	$ 765,184.18	$ 14,068,684.18	$ 10,731,713.58	$ 3,336,970.60	$ 2,805,738.68	$	$ 531,232.22
School Service								
School Lunch and Milk	$ 269,766.00	$ 758.95	$ 270,524.95	$ 186,615.17	$ 83,909.78	$ 40,041.52	$	$ 43,868.26
NDEA Title III	173,300.00	73,756.72	247,056.72	116,791.21	130,265.51	126,492.96		3,772.55
NDEA Title V	69,700.00	32,525.41	102,225.41	60,022.28	42,203.13	40,375.36		1,827.77
Correspondence Course	81,400.00	6,830.55	88,230.55	61,899.36	26,331.19	6,981.29		19,349.90
Sabbatical Leave	37,900.00	38,258.69	76,158.69	43,584.73	32,573.96	18,867.44		13,706.52
Sub-Total	$ 632,066.00	$ 152,130.32	$ 784,196.32	$ 468,912.75	$ 315,283.57	$ 232,758.57	$	$ 82,525.00
Vocational Education								
George Barden	$ 272,900.00	$ 131,219.00	$ 404,119.00	$ 141,248.29	$ 262,870.71	$ 235,013.03	$	$ 27,857.68
Smith Hughes		2,884.08	2,884.08	2,884.08				
Public Law 88-210	481,200.00	222,304.46	703,504.46	359,050.07	344,454.39	330,642.79		13,811.60
Manpower Development and Training Act	437,800.00	26,642.56	464,442.56	304,780.21	159,662.35	159,662.35		
Sub-Total	$ 1,191,900.00	$ 383,050.10	$ 1,574,950.10	$ 807,962.65	$ 766,987.45	$ 725,318.17	$	$ 41,669.28
Special Programs								
Civil Defense Adult Education	50,600.00	1,336.75	51,936.75	8,225.10	43,711.65			43,711.65
Education for the Handicapped	9,000.00		9,000.00	4,454.16	4,545.84	630.37		3,915.47
Ford Foundation Grant		9,128.50	9,128.50		9,128.50	9,128.50		
Teachers Training - Handicapped Children	20,000.00	65,378.50	85,378.50	60,711.05	24,667.45	7,467.95	17,199.50	
Citizenship Night School	600.00		600.00		600.00			600.00
Juveniles in Detention	31,000.00	9,186.98	40,186.98	18,564.31	21,622.67	11,107.25		10,515.42
Economic Opportunity Act	905,000.00	119,617.04	1,024,617.04	308,119.93	716,497.11	39,642.96		676,854.15
PL 89-10 Title I and III	121,700.00	577,298.78	698,998.78	410,168.57	288,830.21	267,409.58		21,420.63
PL 89-10 Title I		1,204,269.83	1,204,269.83	1,019,279.16	184,990.67	184,990.67		
Sub-Total	$ 1,137,900.00	$ 1,966,216.[illegible]	$ [illegible]	$ 1,929,522.28	$ 1,254,594.[illegible]	$ 520,377.29	$ 17,199.50	$ 757,017.32
Library and Museum								
State Library Service	$ 178,500.00	$ 21,657.35	$ 200,157.35	$ 188,271.16	$ 11,886.19	$ 9,155.04	$	$ 2,731.15
Library Construction Grants	124,514.00	121,375.00	245,889.00	64,254.00	181,635.00	181,635.00		
Library Planning Title III	18,885.00		18,885.00	8,025.75	10,859.25	2,892.22		7,967.03
Art Council PL 89-209	2,500.00		2,500.00		2,500.00	2,343.62		156.38
State Museum	39,900.00	1,219.40	41,119.40	22,637.61	18,481.79	5,412.69		13,069.10
Sub-Total	$ 364,299.00	$ 144,251.75	$ 508,550.75	$ 283,188.52	$ 225,362.23	$ 201,438.57	$	$ 23,923.66
Vocational Rehabilitation								
General Program	$ 469,525.00	$ 32,753.67	$ 502,278.67	$ 437,405.31	$ 64,873.36	$ 31,256.60	$	$ 33,616.76
Training Grants	1,748.00	270.84	2,018.84	1,137.24	881.60	259.59		622.01
Small Business Enterprise	4,500.00	1,650.64	6,150.64	2,119.09	4,031.55			4,031.55
Bureau of Old Age Insurance	35,632.00		35,632.00	33,875.84	1,756.16	862.63		893.53
Research and Demonstration	225,000.00	13,791.64	238,791.64	205,659.65	33,131.99	[illegible]		[illegible]
Sub-Total	$ 736,405.00	$ 48,466.79	$ 784,871.79	$ 680,197.13	$ 104,674.66	$ [illegible]	$	$ [illegible]
Department Total	$ 41,148,970.00	$ 4,871,903.20	$ 46,020,873.20	$ 38,321,141.02	$ 7,699,732.18	$ 5,897,233.02	$ 59,717.34	$ 1,752,781.82
UNIVERSITY OF ALASKA								
Administration and Operation	$ 7,314,200.00	$	$ 7,314,200.00	$ 7,314,200.00	$	$	$	$
Total - Education	$ 48,463,170.00	$ 4,871,903.20	$ 53,335,073.20	$ 45,635,341.02	$ 7,699,732.18	$ 5,897,233.02	$ 59,717.34	$ 1,752,781.82

Statement of Expenditures and Encumbrances
Compared with Authorizations
For Fiscal Year Ended June 30, 1966

TABLE III-3f

	Authorizations						Unencumbered Balances	
DEPARTMENT OF EDUCATION	1965-66 Appropriations Including Revisions	Reappropriated For Encumbrances Outstanding 7/1/65 Including Revisions	Total Appropriations	Expenditures	Unexpended Balance	Encumbrances at Close of Year	Continuing Programs	Lapsed
Division of General Administration								
Administration	$ 432,025.00	$ 24,335.08	$ 456,360.08	$ 426,426.72	$ 29,933.36	$ 21,722.13	$	$ 8,211.23
Board of Education	3,000.00		3,000.00	2,562.73	437.27	50.75		386.52
Advisory Commission	17,200.00	418.11	17,618.11	10,881.16	6,736.95	430.85		6,306.10
NDEA Title X	73,000.00	1,926.12	74,926.12	60,386.81	14,539.31	2,833.75		11,705.56
University of Alaska, Merril Act	$ 205,376.00	$	$ 205,376.00	$ 205,376.00	$	$	$	$
PL 8910 Title V	112,295.00		112,295.00	47,638.46	64,656.54	3,246.00	61,410.54	
Headstart Program		689,881.92	689,881.92	458,179.91	231,702.01			231,702.01
Division of District School Support								
Support within Incorporated School Districts	16,934,500.00	706,478.83	17,640,978.83	16,765,171.15	875,807.68	875,807.68		
Pupil Transportation	1,837,989.32	442,254.79	2,280,244.11	2,036,623.83	243,620.28	243,620.28		
State Share Teachers Retirement	740,000.00	167,663.74	907,663.74	553,732.33	353,931.41	353,931.00		.41
Tuition - Nonresident	525,000.00	336,963.25	861,963.25	567,795.52	294,167.73	294,167.73		
Johnson O'Malley Schools	287,800.00	316.80	288,116.80	265,036.38	23,080.42	23,080.00		.42
Disaster Assistance	10,700.00		10,700.00		10,700.00	10,700.00		
Division of State Operated Schools								
Rural Schools	3,649,098.75	243,649.97	3,892,748.72	3,339,679.51	553,069.21	338,693.69		214,375.52
On Base Schools	6,000,000.00	500,303.05	6,500,303.05	5,555,027.52	945,275.53	473,733.49		471,542.04
Johnson O'Malley Schools	327,300.00	21,628.57	348,928.57	279,245.60	69,682.97	34,468.92		35,214.05
Fish and Wildlife Schools	118,800.00	4,699.07	123,499.07	112,212.29	11,286.78	4,876.33		6,410.45
Manpower Development and Training Act	235,071.78	34,070.66	269,142.44	208,358.20	60,784.24	20,894.31		39,889.93
Arts and Humanities	24,072.00		24,072.00	12,673.75	11,398.25	985.18		10,413.07
Division of School Services								
School Lunch and Milk	195,197.00	14,798.72	209,995.72	201,529.92	8,465.80	758.95		7,706.85
NDEA Title III	153,767.50	67,965.08	221,732.58	127,266.82	94,465.76	73,756.72		20,709.04
NDEA Title V	68,483.00	40,127.49	108,610.49	73,443.88	35,166.61	32,625.91		2,540.70
Correspondence Courses	69,000.00	7,770.43	76,770.43	63,960.35	12,810.08	6,830.55		5,979.53
Sabbatical Leave	37,900.00	18,569.95	56,469.95	17,954.62	38,515.33	38,258.69		256.64
Division of Vocational Education								
George Barden	216,557.00	136,381.42	352,938.42	159,986.54	192,951.88	144,131.25		48,820.63
Smith Hughes	30,000.00	1,582.28	31,582.28	6,824.46	24,757.82	3,472.60		21,285.22
Public Law 88-210	500,100.00	12,814.82	512,914.82	169,080.19	343,834.63	254,724.02		89,110.61
Area Redevelopment	13,942.32		13,942.32	6,407.02	7,535.30			7,535.30
Manpower Development and Training Act	1,116,135.00	5,329.73	1,121,464.73	1,084,994.80	36,469.93	6,943.07		29,526.86
Division of Special Programs								
Civil Defense Adult Education	34,200.00	1,305.40	35,505.40	30,201.56	5,303.84	1,336.75		3,967.09
Ford Foundation	5,000.00	9,128.50	14,128.50	5,000.00	9,128.50		9,128.50	
Teachers Training Handicapped Children	79,200.00	5,000.00	84,200.00	18,821.50	65,378.50		65,378.50	
Citizenship Night School	600.00		600.00		600.00			600.00
Juveniles in Detention	40,000.00		40,000.00	2,605.69	37,394.31	9,186.98		28,207.33
Economic Opportunity Act	154,749.00		154,749.00	22,964.22	131,784.78	14,943.15	105,593.00	11,248.63
PL 89 Title I and II - State Level	738,350.00		738,350.00	161,051.22	577,298.78	47,756.21	529,542.57	
PL 89 Title I - A.S.E.A.	1,248,000.00		1,248,000.00	41,030.17	1,206,969.83	814,213.66	392,756.17	
Division of Library and Museum								
Library and Museum	$ 345,225.00	$ 13,047.48	$ 358,272.48	$ 209,490.76	$ 148,781.72	$ 24,406.96	$ 121,375.00	$ 2,999.76
Division of Vocational Rehabilitation								
Vocational Rehabilitation	413,800.00	9,936.71	423,736.71	328,735.06	95,001.65	32,753.67		62,247.98
Training Grants	2,000.00		2,000.00		2,000.00			2,000.00
Small Business Enterprise	3,000.00		3,000.00	437.50	2,562.50	1,650.64		911.86
Bureau of Old Age Survivor's Insurance	32,802.39	1,068.61	33,871.00	33,572.19	298.81			298.81
Research and Demonstration	248,500.00	13,106.24	261,606.24	197,859.95	63,746.29	13,791.64		49,954.65
Department Total	$ 37,279,736.06	$ 3,532,522.82	$ 40,812,258.88	$ 33,870,226.29	$ 6,942,032.59	$ 4,224,783.51	$ 1,285,184.28	$1,432,064.80
UNIVERSITY OF ALASKA								
Administration and Operation	$ 5,878,200.00	$	$ 5,878,200.00	$ 5,844,200.00	$ 34,000.00	$	$	$ 34,000.00
Total - Education	$ 43,157,936.06	$ 3,532,522.82	$ 46,690,458.88	$ 39,714,426.29	$ 6,976,032.59	$ 4,224,783.51	$ 1,285,184.28	$1,466,064.80

ANNEX B

SUPPLEMENTARY DATA ON EDUCATIONAL REQUIREMENT SURVEY

ANNEX B-1	SURVEY OF EDUCATIONAL REQUIREMENTS APPROACH AND PROCEDURE
ANNEX B-2	LINGUISTIC DATA FOR ALASKA
ANNEX B-3	CONFERENCE REPORT IN BARROW
ANNEX B-4	A SKETCH OF EDUCATION IN BARROW, A CASE STUDY
ANNEX B-5	SOURCE REFERENCES

ANNEX B-1

SURVEY OF EDUCATIONAL REQUIREMENTS APPROACH AND PROCEDURES

I. Approach

This task was carried out with the following basic considerations:

A. Background and emphasis on importance of communication with rural, remote schools

   i. Recent redirection by State Department of Education and State-operated Schools from concept of regional and dormitory high schools to small, self-contained units within village.

   ii. Evidence of sterility of small high school employing only traditional, college-preparatory programs.

B. Documentation of clear, and specific differences among rural regions of State

   i. No one Native viewpoint applicable to entire State

      a. Indian groups in Southeastern Alaska typically more concerned with education designated to prepare for entry into dominant culture or society.

      b. Northern Eskimo demonstrates greater desire for tie with tradition and shows fear of youth severing contact with family and community.

   ii. Educational programs must take account for these regional distinctions.

C. Involvement of Native Groups and Leaders

   i. Distinction will be made between recognized Native leaders - recognized at State and National Level - and local (grass roots) leadership.

      a. Both groups important

- * Leaders recognized at State and National Level provide influence and support necessary for implementation of programs.
- * Although involvement at State and National level may have caused isolation from rural community.
- * Often no feeling of identification by local community with Native leader whose activities have removed him from scene.

b. Local leadership more attuned to current problems and attitudes of villagers.

- * Can be identified with some accuracy through their election to advisory school boards.
- * Reflect more direct responsibility to local community.

c. Key to native involvement lies in working with those selected by constituents -- not selected by criteria established by non-Native community.

ii. Utilize leadership structure already established.

a. Alaska Federation of Natives Board of Education (The draft of Chapter II was circulated through the Alaska Federation of Natives, Committee on Education)

b. Local Native group organizations -- Fairbanks Native Association, etc. (Draft circulated through AFN Committee on Education)

II. Procedure

This task was executed with the following methodology and source material:

A. Utilization of existing data

i. Analysis of information currently available including but not limited to:

a. Studies previously mentioned in proposal

b. Records of training sessions conducted with rural advisory school boards -- especially as concerned with establishing curricular priorities.

c. State-Operated Schools Board minutes

d. Minutes of meeting of advisory school board leaders with Alaska State Board of Education in which educational needs were discussed.

e. Reports and studies developed through Teacher Corps project in which student needs translated into instructional competency-based educational programs.

f. Directions 70's (An Assessment of Educational Needs in Alaska) Alaska State Department of Education, August 1970.

ii. Polling of selected Alaska Natives both to test currency and accuracy of existing data and to determine areas of need not heretofore documented.

B. Survey of curriculum materials, audio-visual materials, facilities and personnel

a. Particular attention has been given to pertinent materials available in Human Resources File (University of Alaska Documents Library) and ERIC materials.

b. Compilation of materials available through film libraries at University of Alaska, State-Operated Schools, and local school districts.

c. Analysis of resources being developed through establishment of culturally relevant curricula (e. g., project currently underway at Tanama, Mt. Edgecumbe, and University of Alaska)

ANNEX B-2

LINGUISTIC MAPS OF ALASKA

Further Data for Figure 2-5

LINGUISTIC BREAKDOWN

A. Guide to Language Breakdown on Map

I. Aleut
II. Yupik Eskimo (3 languages)

  a. St. Lawrence Island Yupik
  b. Pacific Gulf Yupik
  c. Central Alaskan Yupik

III. Alaskan Inupiak
IV. Haida (At Hydaburg. Language moribund. Few or no speakers under 50)
V. Tlingit
VI. Eyak
VII. Antena
VIII. Taniana
IX. Ingalik
X. Koyukon
XI. Upper Kushkokwim
XII. Tanana
XIII. Upper Tanana
XIV. Han
XV. Kutchin
XVI. Tsimshian (moribund--at Metlakatla only --few speakers under 50)

B. Name and the Meaning of the Name, Approximate date of Historic Contact, Linguistic Affinities Population through Time

I. Ahtena, "ice people"
1781
Na-Dene: Athapaskan
1740 est., 500; 1880, 300, 1910, 297

II. Yupik, "people" in their own language 1829 for the Kuskokwim River area Yupiks
Eskimoan: Yupik
1880, 14,000

III. Inuit, "people"
1778
Eskimoan: Inupik
1880, 4,000

V. Tlingit, "people" in their own language
1741
Na-Dene: Tlingit
1740 est., 10,000: 1880, 6,763; 1930, 4,462

VI. Eyak, their name for themselves from Eeak tella means "the men of Eyak"
1793
Na-Dene: Eyak
1818, 117; 1890, 117

VII. Ahtena, "ice people"
1781
Na-Dene: Athapaskan
1740 est., 500; 1880, 300, 1910, 297

VIII. Tanaina, "people"in their language
1778
Na-Dene; Athapaskan
1740 est., 1,200; 1860, 641, 1880, 724, 1932, 650

IX. Ingalik "louse people" an Eskimo term for these people
1829
Na-Dene: Athapaskan
1740 est., 1,200 people

X. Koyukon, a contraction of Koyukukhotana meaning "people of the Koyukuk River"
1838
Na-Dene: Athapaskan
1740 est., 1,500, 1890, 940

XII. Tanana, named for the Tanana River
1840
Na-Dene: Athapaskan
1740 est., 500; 1887, 600; 1890, 373; 1910, 415 (The Upper Tanana population in 1930 was 152)

XIV. Han, from the Kutchin designation "those who dwell along the river"
1847
Na-Dene: Athapaskan
1740 est., 200
(The Han were concentrated mainly in Canada)

XV. Kutchin, "one who dwells" in their language, followed by a specific place name
1789
Na-Dene: Athapaskan
1858, 1274
(Many of these people live in Canada)

ANNEX B-3

CONFERENCE REPORT IN BARROW

Report of a conference Harold Wigren had in Barrow with Joseph Upicksoun, President, and Larry Dinneen, Executive Secretary, of the Arctic Slope Native Association, relative to the programming needs which the members of the Arctic Slope Native Association would like to see included in an overall plan for software production.

1. Priority should be given to materials which enhance the pride of the native in his own cultural traditions and language and which enhance his own self-identity. At one point in the discussion, Mr. Upicksoun made this comment, "We cannot say we are completely an Eskimo culture at the moment nor can we say we are completely a western culture. We are a little bit of both and somewhere in between the two. We must have material to help us live in both worlds and to make the transition."

2. Next in priority we would list the need for development of communications skills. Children need to be conversant and fluent not only in the English language but also in the Eskimo language. Mr. Upicksoun felt that the Eskimo language should be taught in the schools and that bilingual teacher aides are very important.

3. Mr. Upicksoun expressed a desire for many programs to be produced in the Arctic Slope regional Eskimo language with communities on the North Slope able to communicate with one another. He stressed the urgent need for improved communications between all of the peoples who live above the Arctic Circle because they have so many problems in common and, at present, little or no opportunity to share ideas or even communicate with one another.

4. Programs are needed, in Upicksoun's opinion, that help the Alaskan native to make the basic change from a subsistence barter economy to a cash economy. The native adult needs programs which will give him insights into beginning business methods, understanding how to open a checking account, learning about credit cards, leases, mortgages, financing and banking. He even pointed out that villages outside of Barrow up to now have been almost wholly on a barter economy, but the situation is changing rapidly and the native needs help in making this transition.

5. There is great need also in Mr. Upicksoun's judgment for information which will help native adults learn how to own their own business. Up to now, the native adult has worked almost exclusively for the white man through the federal government, state government, or private industry. Rarely has

he been in business for himself and he needs this experience. The native Eskimo, as is true with Blacks and Chicanos in the lower 48 states, justifiably want a "piece of the action". They do not want just access; they want ownership! One suggestion made by Mr. Dinneen was that a series of programs be produced on Eskimos who have succeeded in business to give encouragement to other natives.

6. Both Mr. Upicksoun and Mr. Dinneen stressed the importance of helping the native adult understand what the laws of the land mean. They suggested a series of questions and answer programs built around such topics as how their government works (federal, state, local), how to vote, learning how to be better citizens, answering such questions as "Is it legal for us to do this or that?"

7. Other suggestions made by both Mr. Upicksoun and Mr. Dinneen regarding programming included the following:

i. A program series which features octogenarians

Octogenarians are great resources in their community and have a great deal of information about life in Alaska in the past and a multitude of knowledge which should be taped and preserved.

ii. Televised town meetings or general assemblies, conducted in the native regional language.

Both Mr. Upicksoun and Mr. Denneen urge that televised town meetings should be conducted in the two native languages. They point out that if the programs were produced in English, there would be very little dialogue on camera. They urge, therefore, that regional town meetings be held rather than state wide town meetings, at least at the start. Eventually, state-wide town meetings on television could result. Because of the many needs which the Alaskan rural people have in common, some of the topics for the town meetings that were mentioned were:

(a) Borough Government. This is of great interest, particularly now that a borough of Barrow is being contemplated. There is great interest on the North Slope in having all of the regions above the Arctice Circle eventually part of a single borough with common interests and concerns.

(b) Information on the native land claim settlements. This is at present vastly misunderstood or not understood at all. Many natives are puzzled by the settlement, are not sure what they really do get from the settlement, and are not sure of the time constraints which the settlement has imposed.

(c) Information regarding the use of alcohol, and marijuana. A discussion of the problems of alcohol and marijuana and their effects on the body would be most valuable.

(d) Venereal and other social diseases. In many places, these are widespread. Information relative to these problems is imperative.

(e) Discussion of the question of how large a population the Arctic region can support, both in subsistence and in economic development.

iii. A program series providing on television an alternative to the school. Mr. Upicksoun felt that satellite and cable television could be used massively to aid adults without a high school diploma in passing the general educational development test and consequently earning the equivalent of a high school diploma. A similar series could be held on the basic adult education skills. This could be called a TV High School or Operation Second Chance.

iv. Series of Programs on the culture of the subarctic peoples that would include more than just the Eskimo who lives in Alaska but would also include the language, activities, and problems of people who live in Greenland, Iceland, North Canada and the U.S.S.R. Mr. Upicksoun felt at the top of the world nations and their people are closer than anyone realizes and have many mutual problems and concerns. Such a series might be conducted under the auspices of the Center for Northern Education located at the University of Alaska, Fairbanks.

v. A series on native arts and crafts. Dancing, music, skin sewing, native cooking, tanning hides, are good examples. There is a general feeling that many youngsters growing up in today's world on the North Slope don't know some of these skills and they need to learn them.

vi. Televised series of state-wide discussions of high school students on various topics of concern to high school students throughout the state.

vii. Mr. Upicksoun suggested that experimentation be made with the production of non-verbal programs -- programs which use pictures only. His reasoning is that many illiterate native people can be given a great amount of information visually necessary in order to deliver practical information on how to cope with life and its problems. These could be supplemented with visual grades and "readers" for viewers.

NOTE: Such a system has now been initiated in several underveloped countries (particularly most recently in Guatemala) where essential information is broadcast on topics such as family planning, abortion, sanitation, nutrition, first aid, child development, interpersonal relations, etc. These form the basis of a "life coping" curriculum. The University of Wisconsin Extension Division has also done experimentation with this type of visual literacy. They have developed a national adult basic education demonstration project entitled RFD (Rural Family Development) This project could be tapped for valuable information in designing a project for the Alaska population. The Wisconsin project was designed specifically for undereducated and disadvantaged adults, isolated in rural towns and villages -- adults who are handicapped by low levels of reading comprehension and computation, but who also face problems of poverty, unemployment, isolation and a wide-range of personal and family problems that are intensified by stresses of low income and not knowing what to do or where to turn for help.

viii. Both Mr. Upicksoun and Mr. Dinneen made a strong point of stressing the needs of native people to study their own language in the schools. They say it is absolutely essential that children in the schools of Alaska be taught first of all their native language because this gives them pride and dignity in their heritage and it is fundamental before they can in turn learn another language. Interestingly enough, research in the teaching of a second language throughout the nation confirms Mr. Upicksoun's point and also emphasizes that children learn the English language much faster when they first become fluent in their own native language.

ANNEX B-4

A SKETCH OF EDUCATION IN BARROW, A CASE STUDY

A. General Information

Population of Barrow: 2,500
Closest Village: Wainwright -- 90 air miles away Prudhoe Bay -- 25 minutes via air
School enrollment: 700 Kindergarten through grade 9
Type: Bureau of Indian Affairs School
Buildings: three-- primary (k-2), elementary (3-6)
Teachers: 56; teacher aides 21
Composition of teaching staff: a multi-cultural situation

- 3 Barrow Eskimo teachers
- 1 Barrow Eskimo teacher-supervisor
- 3 Indian teachers (non-Alaskan from the lower 48 from Hopi, Blackfoot, Colville tribes
- 1 Black teacher (a woman from Alabama whose husband is also a teacher)
- 1 Japanese-Hawaiian teacher (a woman teacher from Honolulu)

Remainder of teachers are Caucasians -- all are married.
Operational School Budget: close to $1 M for plant operation and salaries
Teacher salaries: Beginning salary $11,000; media salary $14,000
(20% cost of living included but tax deductible)
NEA membership: Of the 52 teachers, 37 are NEA members
Class size: Primary -- 25-30
Elementary -- 25-30
Junior High: 7th grade: 22-27
8th grade: 19-22
9th grade: 18-21

High school students must go to Boarding schools away from Barrow. They must decide where they want to go and can choose one of four places: Chenawa, Oregon; Anchorage; Fairbanks; Mt. Edgecumbe, Sitka, Alaska
Chenawa is the most popular choice and Fairbanks the least popular choice.

B. Description of Instructional Media Center

Has capable staff and is well equipped
Media center has three areas: a large library with 13 learning carrels but few books; a large instructional media service center housing films, recordings, equipment, office section, and director's desk;

a small but adequate darkroom.

Barrow media Center also services Barter Island, Wainwright and five other schools in neighboring villages.

The Library has had no new books in the last three years and shows it!

The Media Center includes the following types of audio-visual equipment:

VTRs:	Two Sony 1/2 inch new standard videotape recorders; two Concord (old standard) video tape recorders; one portable Sony.
8 mm.	1 reel to reel Super-8; 12 film loop projectors; 1 regular 8 mm. projector and 1 super 8 sound. (No film loops are available however for these)
16 mm.	Two available: need more movie projectors.

audio recorders: 12 cassettes (need 28 more cassette portable players and blank tapes)

Satellite communication from ATS-1: one hour per day (3-4 pm) Teachers complain that programs are "dry as dust"

Sony stereo music system, an overhead projector also available.

Listening centers (carrels in library) were built by hand by Natives.

Repairs to audiovisual equipment are not made in Barrow. The equipment must be sent to Anchorage for repair.

CATV installed in 50 homes; must have 125 subscribers to be viable; presently not operating. Rates: $80 to install; $20 per month/owner wants to sell system for $50,000.

C. Community Description

Unemployment rate: 60 to 70% of work force is unemployed.
Needs: need to develop locally owned and run businesses (cooperatives) morale of natives low. They feel there is no hope of succeeding.

Natural gas used and connected to homes.

Trucks, caterpillars are kept running all the time so as not to freeze.

Arctic Slope Native Association -- Joseph Upicksoun, President and Larry Dinneen, Executive Secretary.

ASNA favors the Greater Borough of Barrow plan: to consist of everything above the Arctic Circle -- 56M acres with population of 4500, half of which is in Barrow. Its villages would include Wainright, Barter Island, Anatuvak Pass, Cape Walres, Purdhoe Bay, but not Arctic Village. If this borough were to become a state, border to border (Canada to Bering Sea). Because of the oil there, this borough would have an assessed valuation of $450 M.

ANNEX B-5

SOURCE REFERENCES

Alaska Department of Education. Annual Report, 1970-71. Juneau, Alaska: Alaska Department of Education, Office of Public Information and Publications, December, 1971.

Alaska Rural Teacher Training Corps. "Proposal for 7th Cycle Project, 1972." Alaska State-Operated Schools, Alaska Rural Teacher Training Corps, Anchorage, Alaska, November 19, 1971. (Mimeographed)

Alaskan Outreach '71. College, Alaska: Cooperative Extension Service, University of Alaska, n. d.

Associated Press News Release, reported on KFRB, Fairbanks, Alaska, March 16, 1972.

Bland, Laurel L. "Adult Basic Education Needs Assessment for the State of Alaska." College, Alaska: University of Alaska, May, 1969.

Bloom, Joseph D. "Socio-Cultural Aspects of Alcoholism," Alaska Medicine, XII (September, 1970), 65-67

Bowkett, Norma S. (comp.). Directions 70's: An assessment of Educational Needs in Alaska. Alaska Department of Education, August, 1970.

Carruthers, J. B. Language Survey of Entering Primary Students. Alaska Department of Education, May 1970.

Cassirer, H. R., and H. Wigren. "Alaska: Implications of Satellite Communications for Education." Serial No. 2198/BMS. RD/MC. Paris: UNESCO, November, 1970. (Mimeographed)

Coverdale, Miles L. "The Identification of the School Board Training Needs of Eskimo and Indian Lay Advisory School Board Members of Rural Alaska." Unpublished doctoral dissertation, Utah State University, Logan, Utah, 1971. (Mimeographed)

Devons, John. "Report to the Alaska Educational Broadcast Commission." Anchorage, Alaska, March 10, 1972.

Fairbanks Daily News-Miner, November 22, 1971.

Federal Field Committee for Development Planning in Alaska. Alaska Natives and the Land. Washington: Government Printing Office, October, 1968.

Fleshman, J. Kenneth. "Health of Alaska Natives", Alaska Medicine, X (March, 1968), 39-42.

Forbes, Norma. "Effects of Attitude and Intelligence Variables upon the English Language Achievement of Alaskan Eskimo Children". Unpublished master's thesis, San Jose State College, San Jose, California.

Governor's Commission on Cross-Cultural Education. "Time for Change in the Education of Alaska Natives". A statement of Preliminary Findings and Recommendations Relating to the Education of Alaska Natives Prepared for Governor Keith H. Miller, February, 1970 (Mimeographed)

Kleinfield, Judith. "Cognitive Strengths of Eskimos and Implications for Education." ISEGR Occasional Papers, No. 3. Fairbanks, Alaska: Institute of Social, Economic and Government Research, University of Alaska, November, 1970.

Lafferty, Charles W. "Education of the Alaskan Native". Summary Remarks before the State Board of Education in Juneau, February 4 and 5, 1972. (Mimeographed)

Legislative Council of the State of Alaska and the Brookings Institution. A Conference on the Future of Alaska. Seminar Four, "Alternative Futures for the State of Alaska," 1970. Alpha Section.

Lucille Sage, et al. vs. Alaska State Board of Education. Superior Court for the State of Alaska, Third Judicial District, Case No. 71-1245, April 28, 1971.

"Minutes of the Alaska State Board of Education, Fourteenth Regular Session," Anchorage, Alaska, February 25-26, 1971. Juneau, Alaska: Alaska Department of Education. (Mimeographed)

1971-72 Alaska Educational Directory. Alaska Department of Education.

Nome-Beltz Needs Assessment. Juneau, Alaska: Alaska Department of Education, March, 1970.

"Radical Changes Confront Higher Education". Education, U.S.A., October 18, 1971.

Ray, Charles K., and others. Alaskan Native Secondary School Dropouts. College, Alaska: University of Alaska, 1962.

Ray, Charles K. A Program of Education for Alaska Natives. Revised edition. College, Alaska: University of Alaska, 1959.

Rider, C.D. "First Generation' and Competency-Based Teacher Training: Comments and Recommendations." Anchorage, Alaska: Alaska Methodist University, January 13, 1972. (Mimeographed)

Rogers, Verna C., and Robert R. Rath. "Alaskan Models for Early Childhood Education." Portland, Oregon: Northwest Regional Educational Laboratory, June, 1971. (Mimeographed)

"Rural Education Program: Basic Program Plans." Portland, Oregon: Northwest Regional Educational Laboratory, April, 1972. (Mimeographed)

Salisbury, Lee H. "College Orientation Program for Alaska Natives: COPAN-66, A Final Report." College, Alaska: University of Alaska, January 15, 1967. (Mimeographed)

Thomas, D.K. "Test Results for the Division of State-Operated Schools, March, 1971". Alaska Department of Education, Division of State-Operated Schools, June 15, 1972.

United States Bureau of the Census. 1970 Census of Population: General Social and Economic Characteristics--Alaska. PC(1) C3. Washington, Government Printing Office, November, 1971.

U.S. Congress, Senate, Committee on Labor and Public Welfare. Hearings Before the Subcommittee on Indian Education. 91st Congress, 1st session, 1969. Washington, D.C.: Government Printing Office, 1969.

U.S. Congress, Senate, Committee on Labor and Public Welfare. Indian Education: A National Tragedy--A National Challenge. A special report of the Subcommittee on Indian Education, 91st Congress, 1st Session, on S. Res. 80, November 3, 1969, Report No. 91-501. Washington: Government Printing Office, 1969.

ANNEX C

SUPPLEMENTARY DATA ON INSTRUCTIONAL TECHNOLOGIES

ANNEX C-1 INSTRUCTIONAL MEDIA MATRIX

- A. Needs Expressed as Goals
- B. Characteristics in which one May/Can Evaluate Media as Meeting Needs
- C. Non-Print Media

ANNEX C-2 NATIVE POPULATION — SCHOOL ENROLLMENT SURVEY

ANNEX C-3 INSTRUCTIONAL MATERIALS RESOURCE CENTERS

ANNEX C-4 CURRICULUM SAMPLE OF MATERIALS RECEIVED IN ALASKA

ANNEX C-5 TECHNICAL INFORMATION ON SELECTED INSTRUCTIONAL TECHNOLOGY OPTIONS

- A. Apollo Information Retrieval System
- B. Mitre Time-Shared, Interactive, Computer-Controlled Information Television "TICCIT"
- C. Ampex Pyramid System
- D. Dataplex System
- E. VICOM - Interactive Television System
- F. American Interactive System

ANNEX C-6 BASIC AUDIO-VISUAL EQUIPMENT REQUIRED FOR RURAL LEARNING RESOURCE CENTERS AND UNIT PRICE DATA

ANNEX C-7 ALASKAN NATIVE ORIENTED CURRICULUM MATERIALS

ANNEX C-8 SOURCE REFERENCES

ANNEX C-1

INSTRUCTIONAL,MEDIA MATRIX

A. NEEDS EXPRESSED AS GOALS

1.0 Preservation of native culture and pride of heritage.

- 1.1 Knowledge of history
- 1.2 Preservation of Eskimo dialects
- 1.3 Continuation of native craft skills
- 1.4 Maintenance of self-respect and dignity

2.0 Education relevant to the peoples needs

- 2.1 Curriculum designed around Alaska's rich, varied culture
- 2.2 Materials designed - focal point Alaska
- 2.3 Better teacher training
    - 2.3.1. Credentialed teachers
    - 2.3.2 Paraprofessionals
- 2.4 Enrichment of local environment
- 2.5 Special education for consumers

3.0 Economic needs

- 3.1 Business availability throughout the year
    - 3.1.1. Job availability
- 3.2 Careers counseling and education
- 3.3 Self employment and training
- 3.4 Retraining of potential workers
- 3.5 Leisure time usage

4.0 Raise health standards

- 4.1 Mental health
    - 4.1.1. Alcohol
    - 4.1.2 Drugs
    - 4.1.3. Separation
    - 4.1.4 Suicide
- 4.2 Hygiene

- 4.3 Better housing
- 4.4 Sanitations
- 4.5 Health aid training
- 4.6 Foods and preparation
- 4.7 Safety education
  - 4.7.1 Accident prevention
  - 4.7.2 Use of new machinery

5.0 Better communication needs

- 5.1 Overcome isolation
  - 5.1.1 Language development
  - 5.1.2 Bridge personal and civic isolation
- 5.2 Cross cultural understanding
- 5.3 Cultural transition needs

B. CHARACTERISTICS IN WHICH ONE MAY/CAN EVALUATE MEDIA AS MEETING NEEDS

1.0 Degree of operational skills necessary to manage
2.0 Degree of teacher participation
3.0 Degree of learner participation
4.0 Cost factor of basic media units
5.0 Cost factor of supporting media
6.0 Cost factor of software procurement (local)
7.0 Cost factor of software production (local)
8.0 Cost factor of maintenance/repair
9.0 Evaluation of durability/reliability factors
10.0 Portability/setup/storage/alignment factors
11.0 Technical quality of sensory projection
12.0 General availability of hardware
13.0 General availability of software
14.0 General availability of software "carriers"
15.0 General availability of accessories
16.0 Compatibility with existing media
17.0 Compatibility with existing software
18.0 Compatibility with existing software "carriers"
19.0 Availability of validated evaluations of learning - efficency results
20.0 Availability of validated "user guides" and self instructional manuals

21.0 Degree of appeal to "visual literacy"
22.0 Degree of appeal to auditory senses
23.0 Degree of appeal to taste senses
24.0 Degree of appeal to the olfactory senses
25.0 Multisensory appeal
26.0 Adaptability to "introductory" lessons
27.0 Adaptability to "motivational" lesson units
28.0 Adaptability to "developmental" lesson units
29.0 Adaptability to "summary" lessons
30.0 Adaptability to testing and evaluation phases
31.0 Adaptability to individual research periods
32.0 Adaptability to small group periods
33.0 Adaptability to classroom periods
34.0 Adaptability to large group situations
35.0 Adaptability to independent study situations
36.0 Degree of individualized instruction possible

C. NON-PRINT MEDIA

1.0 The teacher

2.0 Pictorialized Media

2.1 Projected forms

2.1.1 2" x 2" slide projectors
2.1.2 Motion pictures projection

2.1.2.1. 16 mm. reel-to-reel
2.1.2.2 8 mm. (regular/super 8)

2.1.2.2.1 reel-to-reel
2.1.2.2.2 closed loop

2.1.2.3 35 mm. filmstrip projector
2.1.2.4 Overhead Transparency Projector
2.1.2.5 Opaque Projector
2.1.2.6 Special Purpose Formats (3 1/4 x 4)
2.1.2.7 Telestrator

2.2 Non-Projected Pictorials

2.2.1 Flat (still) pictorials
2.2.2 Photographs

3.0 Symbolic-Illustrative Media

- 3.1 Poster
- 3.2 Chart
- 3.3 Diagram
- 3.4 Graphs

4.0 Auditory Media

- 4.1 Magnetic Tape Machines
    - 4.1.1 Reel-to-reel
    - 4.1.2 Cassette
    - 4.1.3 Cartridge
- 4.2 Phonographs (disc recordings)
- 4.3 Public Broadcast Media
    - 4.3.1 Radio
    - 4.3.2 Public Address System

5.0 Simulators and Gaming Devices

6.0 Photographic-recording Media

- 6.1 Motion picture cameras
    - 6.1.1 16 mm format
    - 6.1.2 8 mm. format (regular/super 8)
- 6.2 Still camera
    - 6.2.1 35 mm. format
    - 6.2.2 Instamatic format
    - 6.2.3 "Instant" photography (Polaroid)
    - 6.2.4 Press Camera format (2 1/4 x 2 1/4)
- 6.3 Photo-copy Machines
    - 6.3.1 "Wet process"
    - 6.3.2 "Dry process"
        - 6.3.2.1 Infra-red
        - 6.3.2.2 Electrostatic

7.0 Representative Media

- 7.1 Display Boards
  - 7.1.1 Bulletin Boards
  - 7.1.2 Felt and Flannel Boards
  - 7.1.3 Chalkboard
  - 7.1.4 Special purpose boards (magnetic)
- 7.2 Models, mock-ups and realia

8.0 Television*

- 8.1 Commercial television
- 8.2 Educational television
- 8,3 Instructional television
- 8.4 Video tape recorders (VTR)
- 8.5 Response - TV
- 8.6 Electronic Video Recorders (CBS' EVR)
- 8.7 Discs recording-playback systems

9.0 Programmed Instruction Media

10.0 Multi-media Kits

11.0 Dial Access and Retrieval Systems

12.0 Computer-based Systems (CAI)

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* Via microwave, cable or satellite transmission systems.

ANNEX C-2

NATIVE POPULATION — SCHOOL ENROLLMENT SURVEY

Native Population	SOS Schools			BIA Schools	
	No. of Villages	Enrollment		No. of Villages	Enrollment
		Elem.	Secondary		
1-25	16	8 → 201	1 → 188	-	-
26-50	11	10 → 189	73 → 126	1	11
51-75	19	10 → 31	1	-	-
76-100	14	13 → 39	-	2	28 → 32
101-125	9	26 → 99	45	7	25 → 51
126-150	3	29 → 48	-	4	37 → 56
151-175	8	37 → 70	-	6	35 → 55
176-200	6	54 → 72	1 → 8	3	47 → 61
201-225	2	77 → 79	-	3	43 → 61
226-250	1	80	-	2	80 → 105
251-275	2	111 → 112	9 → 25	5	8 → 80
276-300	2	75 → 101	28	3	45 → 77
301-325	-	-	-	1	105
326-350	-	-	-	1	83
351-375	1	100	-	2	91 → 102
376-400	3	124 → 148	41	3	112 → 141

Native Population	SOS Schools			BIA Schools	
	No. of Villages	Enrollment		No. of Villages	Enrollment
		Elem.	Secondary		
401-425	1	140	-	2	134 → 158
426-450	2	115 → 141	1	-	-
451-475	-	-	-	-	-
471	226	-	-	-	-
Other					
860	1	252	104	-	-
1871	1	742	-	-	-
1338	-	-	-	1	638
1906	-	-	-	1	665

ANNEX C-3

INSTRUCTIONAL MATERIALS RESOURCE CENTERS

It is important that resources already available in Alaska be tapped. As a departure point for the construction of highly individualized instructional materials, we have attempted to draw upon the resources in the Instructional Materials Resource Centers of the Alaskan school systems, the Bureau of Indian Affairs, the University of Alaska, and other agencies serving the people. These resource centers are listed below.

ANCHORAGE BOROUGH SCHOOL DISTRICT
Mr. Bill McCaughan, Director
Instructional Materials Center
Anchorage Borough School District
670 Fireweed Lane
Anchorage, Alaska 99503

STATE OPERATED SCHOOLS DIVISION
Mr. Larry Motz, Supervisor
State-Operated Schools
PERCY-Educational Resource Center
650 International Airport Road
Anchorage, Alaska 9502

BRISTOL BAY BOROUGH SCHOOL DISTRICT
Bristol Bay Audio-Visual Center
Bristol Bay Consolidated Elementary Schools
P.O. Box 527
Naknek, Alaska 99633

Fort Richardson Post Film Library
Fort Richardson On-Base Schools
Pouch 300
Fort Richardson, Alaska 99505

FAIRBANKS, NORTH STAR BOROUGH SCHOOL DISTRICT
Mrs. Bettye Fahrenkamp, Director
Curriculum Service Center
612 Illinois Street
Fairbanks, Alaska 99701

BUREAU OF INDIAN AFFAIRS
Instructional Materials Center
Bureau of Indian Affairs
Barrow Day School
Barrow, Alaska 99723

GREATER JUNEAU BOROUGH SCHOOL DISTRICT
Mr. Harry Swanke
Southeast Alaska Instructional Materials Center
1220 Glacier Avenue
Juneau, Alaska 99801

Instructional Materials Center
Bureau of Indian Affairs
P.O. Box 347
Bethel, Alaska 99559

MATANUSKA SUSITNA BOROUGH SCHOOL DISTRICT
Burton Lum
Instructional Materials Center
Matanuska Susitna Borough
P.O. Box AB
Palmer, Alaska 99645

Instructional Materials Center
Bureau of Indian Affairs
Kotzebue Day School
Kotzebue, Alaska 99752

UNIVERSITY OF ALASKA
Mrs. Jane Williams
Department of Audio-Visual Communications
University of Alaska
College, Alaska 99736

DIVISION OF STATE LIBRARIES
Mr. Richard Engen, Director
Alaska State Library
Capital Building - Pouch F

Mrs. Ruth Anderson
Department of Health & Social Services
Pouch H
Juneau, Alaska 99801

ANNEX C-4

CURRICULUM SAMPLE OF MATERIALS RECEIVED IN ALASKA

I. Course Description for Instructional TV Programs - 15
Anchorage Borough School District - ITV Center

a. The Story Knife - Indian legends made into tv with lesson guides

b. Alaska Ecology - Units developed to include motivational questions, vocabulary, concepts

c. The First Alaskans -- Units developed included resource materials.

d. Just for Fun - Kindergarten-Primary conceptual development catalyst.

e. The Music Place - Teaching music concepts, rhythms and song familiarity. Lesson plans include introduction, listening skills, concepts, covabulary and follow-up (primary level)

f. Art Attic - Awareness of world around them and attitudes toward art. Includes preparation, materials needed, information on film and follow-up.

II. SOS Film Catalogue

[1] 1.0 Preservation of native culture and pride of heritage

- Culture
- The First Alaskans
- Story Knife
- The Music Place

2.0 Education Relevant to the Peoples' needs

Pre-School Education

- Education--Experimental methods: Child of the Future
  Creating Instructional Materials
  From Cradle to Classroom (CA)
  I have an Egg (IJSCA)

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[1] Number listings are matched to the hierarchy categories of Proposed Service Prescription Programs in ANNEX C-1.

Let's Do: Unit 2(PI)
Let's Play" Unit 5(PI)
Let's Pretend: Unit 4(PI)
Let's See: Unit 3(PI)
Let's Talk: Unit 1(PI)
Probing Mind
Search for Learning
Setting the Stage for Learning(SCA)

Adult and Parent Education

- Education of Women: Changing Role of Women (JS)

2.1 Culture -- U.S.: 1964

2.2 Animals--Alaska: Learning about Bears (PI)
Mystery of Animal Behavior (IJSA)

Animals--Antarctic Regions:
Antarctic Biology (JSC)
Noisy Underwater World of the Weddell Seal

Animals--Arctic Regions:
Arctic Region and Its Polar Bears (PIJSA)
Deer and Antelope (PIJ)
Deer Family of North America (IJS)
High Arctic Biome (S)
Large Animals of the Arctic (PIJSA)
Learning About Bears (PI)
Lemmings and Arctic Bird Life (PIJSA)
Tuktu and His Animal Friends (PIJSCA)
Tuktu and His Eskimo Dogs (PIJSCA)
Tuktu and His Big Seal (PIJSCA)
Tuktu and the Caribou Hunt (PIJSCA)

Arctic Regions: Angotee (SCA)
Arctic Borderlands in Winter
Arctic Fishermen in World Trade (IJ)
The Arctic-Islands of the Frozen Sea
The Arctic Region and Its Polar Bears (PIJSA)
Autum River Camp (IJSC)
Caribou Hunting at the Crossing Place(IJSC)
Daring Polar Exploits of the Nineteenth Century (IJSC)
Ecology of the Arctic (JSC)
Eskimo Summer (PIJ)
Fishing at the Stone Weir (IJSC)
High Arctic Biome (S)
How to Build an Igloo (PI)

Land of the Long Day, Part I: Winter and Summer (PI)
Land of the Long Day, Part II: Summer and Autum (PI)
Large Animals of the Arctic (PIJSA)
Learning About Bears (PI)
Lemmings and Arctic Bird Life (PIJSA)
Peary and Henson: North to the Pole (JSC)
Tuktu and His Animal Friends (PIJSCA)
Tuktu and His Eskimo Dogs (PIJSCA)
Tuktu and His Nice New Clothes (PIJSCA)
Tuktu and the Big Kayak (PIJSCA)
Tuktu and the Big Seal (PIJSCA)
Tuktu and the Caribou Hunt (PIJSCA)
Tuktu and the Clever Hands (PIJSCA)
Tuktu and the Indoor Games (PIJSCA)
Tuktu and the Magic Bow (PIJSCA)
Tuktu and the Snow Palace (PIJSCA)
Tuktu and the Magic Spear (PIJSCA)
Tuktu and the Ten Thousand Fishes (PIJSCA)
Tuktu and the Trials of Strength (PIJSCA)
Winter Sea-ice Camp (IJSC)

Arctic Regions -- Discovery and Exploration: Knud Rasmussen -- Arctic Explorer

Arctic Regions -- Economic Conditions:

Annanacks (JSCA)
Arctic Fishermen in World Trade (IJ)
Arctic People (IJS)
Autum River Camp (IJSC)
Caribou Hunting at the Crossing Place (IJS)
Fishing at the Stone Weir (IJSC)
Life in Cold Lands (Eskimo Village) (I)
Living Stone (JSC)
Nanook of the North (JSCA)
Tuktu and His Animal Friends (PIJSCA)
Tuktu and His Eskimo Dogs (PIJSCA)
Tuktu and His Nice New Clothes (PIJSCA)
Tuktu and the Big Kayak (PIJSCA)
Tuktu and the Big Kayak (PIJSCA)
Tuktu and the Big Seal (PIJSCA)
Tuktu and the Caribou Hunt (PIJSCA)
Tuktu and the Clever Hands (PIJSCA)
Tuktu and the Indoor Games (PIJSCA)
Tuktu and the Magic Bow (PIJSCA)
Tuktu and the Magic Spear (PIJSCA)
Tuktu and the Snow Palace (PIJSCA)
Tuktu and the Ten Thousand Fishes (PIJSCA)
Tuktu and the Trials of Strength (PIJSCA)
Winter Sea-ice Camp (IJSC)

Arctic Regions--Social Conditions:
Annanacks (JSCA)
Arctic People (IJS)
Life in Cold Lands (Eskimo Village) (I)
Nanook of the North (JSCA)
Angotee (SCA)

Arctic Regions--Social Life and Customs:
Caribou Hunting at the Crossing Place(IJSC)
Life in Cold Lands (Eskimo Village) (I)
Living Store (JSC)
People of the Reindeer (IJS)

Arctic Regions--Stories: Bear and the Hunter (JS)

2.3 Teachers in Service

Teaching:
Body Image (CA)
Child of the Future
Children learn from filstrips
Choosing a classroom (CA)
Concentration, reasoning (CA)
Creating instructional materials
Eating (CA)
Families and learning: everyone's a teacher
Flash-O capital letters (CA)
Flash-O shapes and numbers (CA)
Flash-O small letters (CA)
From cradle to classroom (CA)
Guiding behavior (SCA)
I have an egg (IJSCA)
I want to go to school (CA)
Imagination, inventiveness, resourcefulness (CA)
Learning through the arts (CA)
Magic letters (CA)
Magic numbers (CA)
Magic shapes (CA)
Observation and memory (CA)
Probing mind
Readiness for reading (CA)
Reading: diagnosing needs (CA)
Reading: directed lessons (CA)
Reading: grouping for instruction (CA)
Science study skills (JS)
Search for learning
Selecting and using ready made materials
Setting the stage for learning (SCA)
Setting the stage for learning (CA)
Sharing time in our class (P)
Simple fractions (CA)
Story of Debbie (JSCA)
Study Skills for beginners (P)

This is Marshall McLuhan: the medium is the
message to speak with friends
Ways of learning (CA)
What do you see now: Parts I and II (CA)
Words and ideas (CA)
Your study methods (I)
Your study skills: doing an assignment (I)
Your study skills: How to use a textbook (I)
Your study skills: reviewing for a test (I)
Your study skills: taking notes on reading (I)
Your study skills: using reference materials (I)

2.5 Consumer Education

Consumer Education: Budgeting (JSCA)
Consumer Education: Installment Buying (JSCA)
Consumer Education: Retail Credit Buying (JSCA)
Planning the Use of Money (IJS)
What Do I receive for my Money (IJS)
What is Money? (IJS)
When I need more Money (IJS)

3.0 Economic Needs

Accounting: Accounting" Basic Procedures (JS)
Accounting Machine: Collator, Calculator (JS)
Bookkeeping: Occupations and Opportunities (JS)

3.5 Business and Economics

Business: America Becomes an Industrial Nation (JSC)
Bookkeeping: Occupations and Opportunities (JS)
Business Machine Operations (JSA)
Growth of Big Business in America (JSC)
Opportunities in Clerical Work (JSA)
Rise of Big Business (JS)
Rise of the Industrial Giants (JSC)
Trusts and Trust Busters (JSC)

Business and Industry: Automation
Automation: What It is and What It Does
Cities and Protection: Protecting Lives and Property
Living City
Living Machine
Pendalum
Productivity: Key to Plenty
Southern New England Region: New Industries

Age of Specialization (IJ)

4.0 Basic Health Standard

Pollution: Air Pollution: A By-product of progress (IJD)
Myths and the parallels
Ohio River: background for social studies
Problem with water is people
Air pollution: Take a Deep and Deadly Breath (JSCA)

4.1 Mental Health (Physical and mental) and Safety

Adolescence:
Acting with Maturity (S)
Adolescence, Love and Maturity (I)
Anatomy of a Teen-Age Courtship (JS)
Anatomy of a Teen-Age Engagement (JS)
Beginning to Date
Dating (JS)
End of Summer (JSC)
Family Problems (JS)
Going Steady (JS)
Growing Up Day by day (PI)
Growing Up: Glandsand Hormones (PI)
Junior High -- A Time of Change
Love: (JS)
Marriage (JS)
Maturing Female (JS)
Personal Values (JS)
Reflections (IJSCA)
River Boy (IJSCA)
Snob
Society and You (JS)
Steps Toward Maturity and Health (IJSA)
Teenage Pregnancy (JS)
Trouble Maker
Twiggy (IJS)
Understanding Others
What About Drinking?
Who Cares? (JS)
Why Vandalism? (JS)
Your Boy During Adolescence (IJS)
Your Junior High Days
You are No Good

Mental Health:
Noises in the Night (PI)
Mental Health
Personality and Emotions
Steps Toward Maturity and Health (IJSA)
Understanding Stresses and Strains

Nutrition:
Food for Health (JS)
Preparing Meals (JS)
Balance Your Diet for Health and Appearance (JS)
Being Responsible: Good Health (PI)
Cell Respiration
Exploring your Growth
Food for Health (JS)
Food Groups and How to Cook Them (JS)
Food revolution (SCA)
Learning about Fruits we Eat (PI)
Metabolic Diversity
Microorganisms with Chlorophyll
Patterns of energy transfer
Preparing Meals (JS)
Roots

4. 7 Accidents:
Artificial Respiration (JS)
Bush First Aid (IJSCA)
First Aid on the Spot (JS)

Accidents--Prevention:
Accidentally Yours (JSCA)
Be a Pro (JSCA)
Fire Prevention in the Home (IJ)
Fundamental Canoeing (IJSCA)
How to Have an Accident in a Home (JSA)
Kitchen Safety
Let's Be Safe at Home
Life is Worth the Living (JSC)
No Time to Spare (IJSCA)
Playground Safety (PI)
Poison (IJSCA)
Safe Living at School (I)
Safety Adventures Out of Doors (PI)
Safety After School (P)
Safety at Home (PI)
Safety on Our School Bus (PIJ)
Safety on the Playground (I)
Safety on the Street (I)
School Shop Safety (JS)
Schools and Safety: David Won't Be Here Today (P)
Shade of Difference (JSCA)
Sixth Wheel (SCA)
Survival Swimming (IJSCA)
Ten Commandments of Gun Safety (IJSCA)
Time Out for Trouble (JSCA)
Use and Care of Axes and Knives (IJSCA)

Contagion and Contagious Diseases: How to Catch a Cold (PIJSA)
Your Protection Against Disease

Safety Education:
Accidentaly Yours (JSCA)
Artificial Respiration (JS)
Be a Pro (JSCA)
Be a Water Wise
Beginning Responsibility: rules at school
Breathing for others (IJSCA)
Bush First Aid (IJSCA)
City Firefighters
Distress signals (IJSCA)
Drill press: basic holding techniques (JSC)
Drive defensively! (S)
Edible plants in summer (IJSCA)
Edible plants in winter (IJSCA)
Emergency compasses (IJSCA)
Fire lookout (PIJSA)
Fire making and shelters (IJSCA)
Fire prevention in the home (IJ)
Fire safety is your problem
Fire: what makes it burn
Grinder and buffer (JSA)
Hand Tools: cutting tools (JS)
Hand tools for metalworking (JSA)
Hand tools for woodworking (JSA)
How to have an accident in the home (JSA)
Introduction to forest adventuring (JSC)
Kitchen management principles (JS)
Kitchen safety
Learning to swim with artificial aids (JSC)
Let's be safe at home
Life is worth the living (JSC)
Lightning and thunder (I)
Making work easier
No time to spare (IJSCA)
Outdoor cooking (IJSCA)
Pack trip in Glacier National Park (IJS)
Playground safety (PI)
Poison (IJSCA)
Portable electric saws (JSA)
Power hacksaw and band saw (JSA)
Proper summer bush clothing (IJSCA)
Proper winter clothing (IJSCA)

Radioisotopes: tools of discovery (S)
Safe living at school (I)
Safety adventures out of doors (PI)
Safety after school (P)
Safety at home (PI)
Safety in the home (I)
Safety on our school bus (PIJ)
Safety on the playground (I)
Safety on the street (I)
School shop safety (JS)
Schools and safety: David won't be here today(P)
Seconds count (IJSCA)
Self defense for girls (IJS)
Shade of difference (JSCA)
Shelter construction in winter (IJSCA)
Shotgun shooting and how (JSCA)
Signs (PI)
Sixth Wheel (SCA)
Snakes
Snowshoeing (IJSCA)
Soft sholdering (JSC)
Starting to swim (IJS)
Survival kit (IJSCA)
Survival swimming (IJSCA)
Ten commandments of gun safety (IJSCA)
Time out for trouble (JSCA)
Traps and snares in summer (IJSCA)
Use and care of axes and knives (IJSCA)
Using a compass (IJSCA)
Water safety
Winter distress signals (IJSCA)

5.0 Better Communications Needs

News

Getting the News (IJ)
Censorship: A Question of Judgment (JSCA)
Getting the News (IJ)
How to read newspapers (J)
Newspaper story
Story of a Newspaperman (JS)
Current Events: Understanding and Evaluating Them

Communication

Animals and How they Communicate
Cities and Communication: Keeping the Community Informed
Comming of Man (IJ)
Communication for Beginners

Communication: Story of its Development
Communications: A First Film (PI)
Communications and the Community
Communities Depend on Each Other (P)
Current Events: Understanding and Evaluating Them
Discovering the Music of Africa
Effective listening
Federal Communications Commission (JSC)
Function of Gestures
Get the Message (PIJSA)
Getting the News (IJ)
Getting Yourself Across
Girdle Round the Earth (JSC)
How to Conduct a Discussion (JSC)
Improve Your Oral Reports (IJ)
Is there Communication When You Speak
Language of the Mute Swan
Listening Skills: An Introduction (IJS)
Mailman (PI)
Oral Communications: Communicating Correcting (JSC)
Oral Communications: Effective Persuasion (JSC)
Oral Communications: Group Problem Solving (JSC)
Oral Communications: Planning a Speech (JSC)
Oral Communications: Researching a Topic (JSC)
Oral Communications: The Power of Emotion in Speech (JSC)
Planning your Talk
Platform Posture
Pony Express in America's Growth (IJ)
Public Speaking: Fundamentals (JS)
Reporting in Class
Social Insects: The Honeybee
Speech Skills: Using your Voice Effectively (JS)
Stage Fright and What to do About It
Stange Case of the English Language (SCA)
This is Marshall McLuhan: The Medium is the Message
Wires to Our House (IJ)
Your Communication Skills: Listening (IJ)
Your Communication Skills: Reading (IJ)
Your Communication Skills: Speaking (IJ)
Your Communication Skills: The Eachange of Ideas (IJ)
Your Communication Skills: Writing (IJ)

6.0 Language Development

Communication: Story of its development
Communications: A First Film (PI)
English Language: How it changes
English Language: Patterns of usage (JS)
Get the Message (PIJSA)
Strange Case of the English Language (SCA)

ANNEX C-5

TECHNICAL INFORMATION ON SELECTED INSTRUCTIONAL TECHNOLOGY OPTIONS

A. APOLLO INFORMATION RETRIEVAL SYSTEM

The Apollo Information Retrieval System custom-made by AV Electronics Inc. of Fresno uses a video disc magnetic system to record a series of still pictures which have been sent by TV methods. Using another disc as a buffer, selected stills or a series of stills can be sent. A computer processing unit can randomly select or delete individually addressed pictures from the master magnetic storage disc without disturbing other frames.

An Apollo system uses a video disc subsystem including a master disc with buffer channels and a video switch, a buffer disc with retrieval capability, a camera, switching, and cables for conversion of conventional pictures to video signals.

Cue signals routed through a computer processing unit start a video update cycle to match the proper frame to remotely controlled reel to reel or cassette audio magnetic tapes.

B. MITRE TIME-SHARED, INTERACTIVE, COMPUTER-CONTROLLED, INFORMATION TELEVISION "TICCIT"

Adapting to the wider use of CATV linking homes with a computer, Mitre TICCIT system transmitting still pictures to home viewers is programmed by the computer for interactive communication. Approximately 66 active terminals can share one wide band cable. A local signal refreshing device using a video cassette keeps the quality of the picture at a high level. Standard telephone lines provide the interaction. TICCIT's computer generated or controlled information can be selectively received and displayed upon call from any independent user. During off hours, the user can store programs to be seen by him later.

The home viewer's installation includes a television cassette recorder with a single frame refresh capacity. In schools, this equipment could be located in a study carrel.

The computer facility includes mini-computers, mass storage discs, disc drives, communication coupler, modems and a high speed electronic disc character generator to convert computer output into television display output.

The computer incorporates an enclosed address of the particular requesting home in each frame and sends it to the correct address. Standard phone lines terminated in modems convert information into digital format acceptable by the computer communication controller. They automatically answer and disconnect calls as well as provide a special circuit to allow injection of audio back.

The Mitre system coupled with an interactive television system such as DATA-PLEX gives a capability for computer-based two-way video and two-way audio.

C. AMPEX PYRAMID SYSTEM

One of the latest tools to serve the goals of instructional technology in education is an electronic system for distributing audio and video materials which are stored in locations remote from where they are used. Known as RAAIRS (Remote Access Audiovisual Information System) or Dial Access Retrieval System or simply Dial Access, the system records on tape or film, the materials that are accessed by the learner by dialing a designated numeral on the material. The material called for by the learner is received immediately by headphones, loudspeakers, tv sets, via communication links with central control room. The learner may be in a study booth or carrel, each having a dialing or pushbutton selection device, a volume control and headphones. The receiver could also be a lecturer in front of an audience. This center will also probably have a tv monitor to introduce picture capability within the environment.

Links may be made to other systems in other locations. Some stations are audio-active enabling the learner to speak into a microphone to hear himself simultaneously through earphones. Other systems provide plug-in jacks so the learner can tape programs on a personal recorder.

The most sophisticated system provides the student flexible control over all phases of his input, so that he can relisten to various sections of the material, making it possible to synchronize video with the audio, etc. Schools, homes or even whole regions can be tied together.

The Ampex Pyramide System represents a comprehensive medium for the distribution of stored information. Using a computer for centralized control and high speed duplication techniques, the system incorporates the use of random access audio, random access video and data processing.

Magnetic tapes stored in a master reproducer and cued from a computer can be duplicated within thirty seconds. Magnetic discs are used to store video with similar retrieval rate. The audio and video can be called forth together and coordinated by the computer.

This system is so designed that access and retrieval are always immediate and always from the beginning of the program with the material remaining under the user's control for as long as he requires it.

An audio master system includes the master reproducer and student buffers and associated audio loading rack. A student buffer is a transport for a two-track audio tape. One track duplicates from the master reproducer storage and reproduces it at a normal speaking speed. The other track can record and play back the user's voice. During the transfer of the audio program from the buffer to its user-receiver, the visuals are encoded, thus synchronizing pictures and narrative.

The video master system (based on storage of individual frames or images) includes a master video disc, student buffers and associated video loading rack.

Current design indicates that one master reproducer will drive up to five slave recorders -- each slave recorder when equipped with an automatic loading device will hold up to 50 blank cassette tapes. The system operates automatically, recycling and recording as long as a cassette remains in the loader and then automatically shuts off. Approximately 53 copies of a one-hour cassette can be made in one hour with one master and one slave with an automatic loader.

This system can be tied in to radio, television, CATV, microwave transmission as well as telephone and teletype systems.

D. DATAPLEX SYSTEM

TV has long been recognized as an educational force of big learning potential with specific learnings being adapted to non-broadcast educational TV for use in the classroom. However, one of its most serious defects is that it is a one way flow of communication in its most popular usage, impersonal and unapproachable. In order to assure maximum benefits from the learning situation, it is necessary for the learner to respond to stimuli and get feedback which will enable him to know how he is understanding the information presented.

The one interactive TV system known as Data Plex, Inc. Responsive TV has the unique capacity through electronic screen blockage to respond lineary with eight choices, or respond in four individual quadrants of the screen or respond in halves of the screen. Other combinations can be developed into the system, also, including display of the whole screen with all of its options.

In order to operate the machine, the learner has in front of him a small box with appropriate buttons to push that will result in the screen blockage. The button also signals the corresponding section of the audio tape to feedback to the learner how his response is related to the previous function.

This system is capable of transmitting acceptable color signals and uses a V + R for program source, which can distribute video information to one or several reception stations simultaneously.

The system can operate with most TV recording and playback equipment, but special modifications might be required for existing school equipment.

E. VICOM - INTERACTIVE TELEVISION SYSTEM

Previous ventures in two way communication have been limited experiments with fire and burglar systems. This new interactive system uses a two-way visual and two-way audio system. The key innovation is a terminal unit developed by Vicom Manufacturing of Dexter, Michigan, is an integrated audio-video interactive terminal unit which is said to handle vastly larger amounts of information than previous models. Using this equipment, a child at home (connected with school via cable) presses a series of buttons (similar to a touch phone) on his terminal. The teacher answers in the same way, permitting the two to converse. They would be able to see each other, since the child has a small camera along with his terminal equipment.

Through Vicom, a disabled child is able to "raise his hand" in the classroom by punching a button on a terminal in his home. The teacher can answer by punching a button on a terminal in the classroom and the two can then converse. The teacher will be able to see the child on a TV screen in the classroom.

The system is designed so that one teacher can handle many children on one circuit, creating, in effect, a classroom.

The emphasis in the initial test period will be on the education of disabled children in the area. Overland Park, a city of 75,000 has more than 200 children who are unable to attend school regularly because of some disability. (There are more than two million in the nation). The local school district is setting up a network so that handicapped children can actually participate in classroom work during regular school hours.

F. AMERICAN INTERACTIVE SYSTEM

The building blocks in the concept include a complete stand-alone electronic responder system which can completely and quickly analyze the performance of each and every student in a class, and keep records on the class over a period of time. This responder system uses part of the eventual central processing system which does include the starter package for a computer.

The next step includes an interactive text and graphics arrangement where the student is actually at a visual terminal and, with a slightly different key board than is used in the responder system, can interact with graphics and text information prepared in a high speed format advanced by an individual teacher or instructor. The text and graphics could be prepared in a large mode by a central media group should that be available.

It is possible to add the audio master storage file which has a large capacity for high speed duplication. The student terminal can be combined along with mass video storage in the form of very realiable high speed access to thousands and thousands of still frame pictures. The audio concept allows for a student copy to be made and for the student to control his copy yet he physically never controls his buffer unit. He does it by means of talking to the central processer. He may, at a later date, make a cassette copy of the audio program for take away purposes.

The terminal is a responder terminal, an interactive text and graphic terminal or a combined audio and video terminal all of which use basic television for display. The terminal could be disconnected from the central coaxial cable to which it is connected and be reconnected in a different classroom located in a different position. In effect, you could take one or more responder systems in one or more classrooms and move them about in different parts of the school.

Everything in the system is RF compatible. It is possible to take any terminal in an interactive mode and serve at least 1,000 people simultaneously with a high degree of reliability.

ANNEX C-6

BASIC AUDIO-VISUAL EQUIPMENT REQUIRED FOR RURAL LEARNING RESOURCE CENTERS AND UNIT PRICE DATA

NAVA PAGE	QUANTITY	ITEM	PRICE $
12	5-7	Graflex 16 mm, model 1160 better than autoload, with all the same- and more- features	500
		Accessories: zoom lens ($40) and extension speaker ($70)	
77	5	3M Model 525 sound-on-slide projectors	550
		(buy one master unit for every five slave-playback only- models)	(350)
77	5-10	Montage Auto-Mate 600; the best small cassette syno unit for use with 8mm or carousel slides	149
81	1	Kodak Ektographic RA-960 permits retrieval of any slide in a carousel tray (random access!)	700
259	1-10	PM-10 rear projection module fits atop any desk providing an "instant carrel".	80
253	1-5	Basch Cabinet, model 624-U a portable large group rear screen unit	230
303	1-50	Wollensak Wireless loop System to rig any standard room or area (or table top) for wireless reception from any standard audio source. Headphones - $22 (Individuals) Loop Kits - $30 Listening Center - $30 (groups)	see below
	1-?	Bretford projection carts #MT026 (cart w/built in headphones jaoks)	68
		#T554 standard 48" cart for general transportation	40
		#UTR-36 Video tape cart	52
		#OH29 for overhead use	42
		#300 series-stacking cabinets for assorted media storage	100

NAVA PAGE	QUANTITY	ITEM	PRICE $
339	1-2	Elden's Abodia #5000 a storage cabinet for 2x2 slides with a lighted background you had a smaller version at C. U.	420
198	105	Akai 1/4" VTR system Model 100 (home TV converter, 135)	500
205	1-5	Sony 1/2" portable Model 3400 (add $200 per monitor)	695
	5-10	Kodak Ektagraphic Slide Proj. Model E-2 (basic unit) Filmstrip adapter ($24), stak loader (10.), case ($10), zoom lens ($20)	89
75	1-2	Creatron Cimemasound 2000 (Carousel-cassette sync unit for large group showings)	450
89	5-10	VuGraph Century Model (the best OTP) (economy line-AO Apollo 6 at $120)	154
99	1	Vulyte III Opaque Proj. (for non-transparent projection)	340
120	1-?	ATC-700 Phonograph (the best at $210)	
120	1-?	(Economy: ATC525T at $92)	
147	1-3	Wollensak Reel to Reel Tape Recorder Model 6250AV (Stereo)	325
147	1-3	Model 6020 AV (monural)	145
150	1-5	ATC-130 Cassette unit for group-size reproduction	130
159	1-?	Sony 110A Cassette for individual use	89
160	10-20	Cassette Player, model CS101 (Teaching Technology Corp.) inexpensive cassettes for playback only	22
168 (p. 170)	1-2 1-2	Cassette Duplicator Model ATC450 (inexpensive model 28A19 at $325)	600
186	1	Intermedia TP-2 carrousel, etc. (3 units controlled in sync for multi-media presentation)	260
193	1-3	Wollensak 2550 Cassette-slide sync unit for production level use	240

NAVA PAGE	QUANTITY	ITEM	PRICE $
195	1-2	R-7 Dissolve/Sync/Fader by Intermedia	350
219	1	Nasco PC-2 TV production carrsole for in-house TV studio work (or the unit in the TV brochure)	2,400
248	1-10	Knox Tripod Screens, 70x79 (Series 300)	60
249	1-10	Knox Wall screens, 7' x 5' (series 500)	80
	1-10	Kodak Visualmakers, Model 2	80
	1-2	Nikon 35 mm. camera system	600
	1-2	Minolta (or Pentax) SR-7 35 mm. camera system	400
396	1	Gestetner Model 455 stencil and transparency maker	1,500
397	1	Drazo 30 (Mark V) for permanent ozalid, transparencies	298
398	1	3M M58 copier (from bound originals)	210
399	1-2	3M Secretary 45 copier	350
23	1-3	Kodak Ektagraphic MFS-8 8mm projector (remote control)	285
23	1-5	Ektagraphic 120A 8mm cartridge	98
34	1-10	B+H Filmstrip 745-C (autoload)	129
60	1-10	Graflex Study Mate Auto Vance II (Cassette-filmstrip and portable)	89
206	1-2	Sony VTR Model AV3650 (Heavy duty EIA5 with editing and stop motion) (monitors-$300, per)	950
253	1-5	Brewster Sho-Wall (rear screen +teaching surface)	150

NAVA PAGE	QUANTITY	ITEM	PRICE $
279	1-5	Howe Study Carrel A complete self-parced carrel with all the necessary media, screen outlets, etc.	580
287	1-10	Norelco "PIP" system (cassette paced individual learning modules)	200

ANNEX C-7

ALASKAN NATIVE ORIENTED CURRICULUM MATERIALS

The following agencies are producing materials for the Alaskan native. Some are being produced for a particular curriculum specialty item while others are being produced in a more general scope.

ALASKA CRIPPLED CHILDRENS ASSOCIATION: Video tape and filmstrip materials on the child who has partial or total loss of hearing. A.C.C.A. has also printed a book which teaches sign language to the Alaskan child using the Alaskan culture in its presentation.

NORTHWEST REGIONAL LABORATORY: Produced the Alaskan Reader which is being used in approximately forty rural schools. The new reading series (nine levels) was developed especially for Alaskan rural schools and is in the third year of implementation. Marie Hamblin, Elementary Consultant for Alaska State-Operated Schools has all statistics for this project.

ANCHORAGE BOROUGH SCHOOL DISTRICT: During a Title III project, Anchorage Borough Instructional Television produced on video-tape approximately 15 programs relevant to the Alaskan native. Cultural heritage items such as native tales, string games and surviving in a harsh environment are among the programs produced.

ARCTIC: Video-tape material at upper and lower division college level teacher preparation, i.e., Anthropology, Education Psychology, Tests and Measurements, History, Developmental Psychology, etc. Ancillary and supportive printed materials were also produced for the program.

CHILDREN'S CACHE: Producing booklets, audio tapes (music & sotires) and a monthly newsletter dealing with early childhood education.

ALASKA STATE MUSEUM: Producing travel exhibits on Anthropology and related subjects which are sent to the villages for display and manipulation. The Museum is also producing video tape programs on environmental education. These programs are available to those communities which have video playback systems.

ALASKA STATE-OPERATED SCHOOLS: Is currently in the initial stages of producing on 16 mm film (color/sound) three programs using puppetry to portray a Native legend, story or historical event; an instructional film in a selected reading skill; an instructional film on the importance of community involvement, through its local school board, in decisions regarding its school(s).

BILINGUAL EDUCATION PROGRAM: Is producing a variety of mediating aids relevant to Bilingual education of the Alaskan Native child. Videotapes, printed booklets and audio tapes are among its inventory.

PHONOLINGUIST PROGRAM: Producing printed materials (cookbooks) on the teacher and student level on the diagnostic, prescriptive approach to reading. In Phase II, video tape materials are to be produced.

CINE SOUND, INC., BOX 462, ANCHORAGE, ALASKA: Produced for the State of Alaska a film on tourism which shows the many and varied cultures of Alaska. In filming this program, thousands of raw footage on Alaska and its people are available to other users.

ANNEX C-8

SOURCE REFERENCES

Audiovisual Instruction, Telecommunications, April 1972, AECT Washington, D.C. 104 pages.

Barcus, Earle F., Saturday Children's Television: A Report of TV Programming and Advertising on Boston Commercial Television, Action for Children's Television, 1971, 112 pages, EDRS price microfiche 65¢, hardcopy $6.58, ED 055 461

Barnett, H.J. and A. T. Denzau, Future Development of Instructional Television, Washington University, St. Louis, Missouri, 1971, 43 pages, EDRS price microfiche 65¢, hardcopy $3.29.

Bourret, Phillip L. TV and in Rural Areas: A Low Alternative, Department of Health,Education and Welfare, Washington, D.C. May, 1971, 13 pages, EDRS price microfiche 65¢, hardcopy $3.29.

Cassirer, H.R. and H. Wigren, Implications of Satellite Communication for Education, UNESCO, 1970.

Denzau, Arthur, Public Education Finances: 1949-1985, Washington University, St. Louis, Missouri, 1971, 45 pages, EDRS price microfiche 65¢, hardcopy $3.29

DuMolin, James and Robert P. Morgan, An Instructional Satellite System for the United States: Preliminary Consideration, Washington University, St. Louis, Missouri, 1971, 47 pages, EDRS price microfiche 65¢, hardcopy $3.29, ED 055 428.

DuMolin, James R., Instructional Television Utilization in the United States, Washington University, St. Louis, Missouri, 1971, 49 pages, EDRS price microfiche 65¢, hardcopy $3.29, ED 055 427.

Elliott, Richard B., Report of the First Annual Conference of the Western Educational Society for Telecommunications, 1971, 172 pages, EDRS price microfiche 65¢, hardcopy $6.58, ED 055 405.

Hall, George L. and Frank Norwood, A Plan for the Development of Educational Telecommunications in Alaska: Report of A Study Conducted by the National Association of Educational Broadcasters for the Alaska Educational Broadcasting Commission, National Association of Educational Broadcasters, Washington, D.C., 1970, 44 pages.

Hardy, Miller and Gallegos, A Study of a Proposed Multi-Purpose Communications System, Washington State University, Pullman, 1971, 131 pages, EDRS price microfiche 65¢, hardcopy $6.58, ED 055 453

Humphrey, David A., The Cost of Maintaining Educational Communications Equipment, State University of New York at Albany, paper presented at New York State Educational Communications Association Convention, 1971, 18 pages, EDRS price microfiche 65¢, hardcopy $3.29, ED 055 542

Humphrey, David A., Getting It All Together : The Organization and Staffing of Educational Communications Centers for Higher Education, 1971, 28 pages, EDRS price microfiche 65¢, hardcopy $3.29, ED 055 434

Japanese National Commission for UNESCO, Educational Broadcasts of NHK (Special Issue of NHK Today and Tomorrow), 1971, 47 pages, EDRS price microfiche 65¢, hardcopy $3.29, ED 055 438

Kimmel, Paul, Naomi E. Kies and Jack Lyle, TV and Education for Children of Migrant Farm Workers, Indians, and Inner-City Poor Cross Cultural Comparisons of International Uses of Media, Vol. II Case Studies, U.S. Department of Health, Education and Welfare, Washington, D.C., 1971, 198 pages, EDRS price microfiche 65¢, hardcopy $3.29.

Korman, Frank, Innovations in Telecommunications Technology: Implications for Education, Texas University, Austin, Center for Communication Research, 1971, 150 pages, EDRS price microfiche 65¢,, hardcopy $6.58, ED 055 415.

McAnany, Emile G., John K. Mayo and Robert C. Hornik, Television and Educational Reform in El Salvador, Research Report No. 4, Institute for Communication Research, Stanford University, Stanford, California, 1970, 158 pages, EDRS price microfiche 65¢, hardcopy $3.29.

Miller, Leroy, Public Television: How Our Users See Us, Corporation for Public Broadcasting, Washington, D.C., 1971, 13 pages, ED 055 418.

Morgan, Robert P., Jai P. Singh, Herbert M. Ohlman and James R. DoMolin, Application of Communications Satellites to Educational Development: An Overview of the Washington University Program, Washington University, St. Louis, Missouri, 1971, 68 pages, EDRS Price microfiche 65¢, hardcopy $3.29.

Morgan, Robert P. and Jai P. Singh, A Guide to the Literature on Application of Communications Satellites to Educational Development, Washington University, St. Louis, Missouri, 1972, 37 pages, EDRS price microfiche 65¢, hardcopy $3.29.

Ohlman, Herbert, Communications Media and Educational Technology: An Overview and Assessment with Reference to Communication Satellites, Washington University, St. Louis, Missouri, 1971, 232 pages, EDRS price microfiche 65¢, hardcopy $3.29.

Parker, Walter B., Action Study of Educational Uses of Satellite Telecommunications in Remote Alaskan Communities, 1972, 24 pages.

Preparatory Study of a Pilot Project in the Use of Satellite Communication for National Development Purposes in India, United Nations Educational, Scientific and Cultural Organization, 1967, 35 pages.

Project IMPACT Computer-Administered Instruction: Preparing and Managing the Content of Instruction, IMPACT Text-Handling Subsystem, Human Resources Research Organization, Alexandria, Virginia, 1971, 53 pages, EDRS price microfiche 65¢, hardcopy $3.29, ED 055 450.

Reply Comments: Action for Children's Television, Docket Number 19142, 1971, 70 pages, EDRS price microfiche 65¢, hardcopy $3.29, ED 055 462.

Schmid, Giles H., Diocesan Learning Networks: Alternatives and Opportunities in Instructional Television, United States Catholic Conference, Washington, D.C., 1971, 56 pages, EDRS price microfiche 65¢. hardcopy $3.29, ED 055 444.

Schramm, Wilbur, John K. Mayo, Emile G. McAnany and Robert C. Hornik, Television and Educational Reform in El Salvador, Research Report No. 7, Institute for Communication Research, Stanford University, Stanford, California, 1971, 171 pages, EDRS price microfiche 65¢, hardcopy $3.29.

Singh, Jai P. and Robert P. Morgan, Computer-Based Instruction: A Background Paper on its Status, Cost/Effectiveness and Telecommunications Requirements, Washington University, St. Louis, Missouri, 1971, 40 pages. EDRS price microfiche 65¢, hardcopy $3.29, ED 055 429.

Singh, Jai P. and Robert P. Morgan, Educational Computer Utilization and Computer Communications, Washington University, St. Louis, Missouri, 1971 94 pages, EDRS price microfiche 65 ¢, hardcopy $3.29.

Singh, Jai P. and Robert P. Morgan, *Educational Electronic Information Dissemination and Broadcast Services: History, Current Infrastructure and Public Broadcasting Requirements,* Washington University, St. Louis, Missouri, 1971 EDRS price microfiche 65¢, hardcopy $3.29.

Singh, Jai P., *Operating Frequencies for Educational Satellite Services,* Washington University, St. Louis, Missouri, 1971, 65 pages, EDRS price microfiche 65¢, hardcopy $3.29.

Smith, Robert D., *A Statement of the Concept of an Urban Telecommunications Center,* paper presented at 1971 National Association of Educational Broadcasters Convention, 10 pages, EDRS price microfiche 65¢, hardcopy $3.29, ED 055 416

Wagner, Richard V., William A. Lybrand and Wayne M. Reznick, *A Study of Systematic Resistances to Utilization of ITV in Public School Systems,* U.S. Department of Health, Education and Welfare, Washington, D.C., 1969, 220 pages, EDRS price microfiche 65¢, hardcopy $3.29.

ANNEX D

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ANNEX D-4 DATA BASE ON EXISTING ELECTRIC POWER FACILITIES AND PLANS FOR RURAL COMMUNITIES

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ANNEX D-5 INVENTORY TABLES ON ALASKA RURAL SCHOOLS

ANNEX D-1

SUMMARY OF PROPOSED PLANS FOR SATELLITE COMMUNICATIONS IN ALASKA

1. Introduction

In the 1970 Report and Order, the FCC requested each applicant to state whether its proposed domestic satellite system would be capable of providing service to Alaska and Hawaii. Subsequent filings of the eight[1] system applicants were reviewed by the Project Team to determine how the proffered services might be used to satisfy the educational requirements of rural Alaska.

While it must be concluded that all of the proposed systems offer some capability for serving Alaska, only a few applicants discussed the subject in any detail, and only two, Comsat and RCA, have applied for earth stations in Alaska. Only those proposals which commented in any depth on the subject are summarized here. In addition to Comsat and RCA, these included MCI Lockheed and Fairchild.

A report by Goddard Space Flight Center, NASA[2] on available satellite resources to provide a dedicated satellite system for Alaska, was also reviewed.

Informal discussions were held with officials of Telesat, Canada and the Canadian Government, to examine the feasibility of using Canadian satellite resources to satisfy the requirements of rural Alaska. Some of the considerations involved in such a project are commented upon.

The use of NASA ATS satellites is not discussed in this report since their experimental nature will not provide a long term solution to the problem. The ATS programs will continue to provide an invaluable service in establishing the technological and operational basis for the satisfaction of educational requirements in isolated communities. It is anticipated that Alaska will have increased participation in ATS experimental program; as it continues to develop plans for improving the education of rural Alaskans.

2. Comsat Domestic Satellite Application

In its application for a domestic satellite system, Comsat has filed for two 32 foot receiving/transmitting earth stations at Juneau and Prudhoe Bay, to be used for interstate and intrastate traffic, as well as a 42 foot, receive only earth station at Talkeetna for TV reception from the lower 48 states. In addition, Comsat offers a comprehensive plan for Alaska, which, if accepted by the Alaska Public Utilities Commission and the Federal Communications Commission, would provide eight additional 32 foot, transmit/receive stations at the following locations:

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[1] System applications were submitted by: The Western Union Telegraph Company (Western Union), Hughes Aircraft Co. and GTE Service Corp. (Hughes/GTE), RCA Globcom and RCA Alascom (RCA), Comsat and AT&T (Comsat/ATT), Comsat, MCI Lockheed Satellite Corporation (MCI Lockheed) and Fairchild Industries, Inc. (Fairchild).

[2] "Communications Satellite System for Alaska," Goddard Space Flight Center, NASA, March 1971.

Bethel	Katzebue
Ketchikan	Galena
King Salmon	Nome
Kodiak	Barrow

Furthermore, depending on confirmation by government agencies, similar stations at Adak, Cold Bay and/or Shemya might be added. These 32 foot stations would have a G/T ratio of $31dB/^{O}K$ and would utilize 2-3 satellite transponders on a spot beam.

It is Comsat's plan to integrate these stations into the existing terrestrial network in Alaska (see Figure A). The objective is to increase the network capacity, improve circuit performance and to eliminate some of the existing tropo links on which the terrestrial network must now rely.

Comsat's proposed plan for Alaska would do little or nothing to provide services to the remote, isolated bush communities. For this service Comsat discussed a technical plan to provide remote communities with video, radio and 2-way telephone communications. These services would be provided through 16 foot ground terminals costing between $40, 000 and $100, 000. Video quality would be equivalent to that obtained with Early Bird. Two-way communications would be provided by demand assigned telephone circuits, using single-channel-per-carrier equipment, with all stations sharing a common pool of satellite channels.

Comsat argues that the requirements for this service have not yet been sufficiently defined to permit detailed planning and proposes that the bush stations could be provided in a second phase of the plan. It is pointed out that since it is unlikely that the required services to remote communities will be self supporting, technical and financial plans will have to be worked out through the cooperation of all interested parties. Comsat expresses its willingness to participate in a joint planning effort to provide bush services via satellite at the earliest feasible opportunity.

3. RCA Application for a Domestic Satellite System

In the first phase of development to provide expanded intra-state and interstate communications via the U.S. domestic satellite, RCA proposes major earth stations at the three toll centers of Fairbanks, Juneau and Ketchikan, use of the Bartlett earth station near Anchorage and a station at Prudhoe Bay. These stations would provide high-capacity links for voice and data service between major Alaskan cities and with the 48 contiguous states and Hawaii.

RCA estimates of telephone circuits which will be required by 1981 are shown in Table 1:

Table 1

City	Intrastate Circuits	Interstate Circuits	Total Circuits
Anchorage	258	527	785
Fairbanks	222	281	503
Juneau	78	68	146
Ketchikan	66	44	110
Prudhoe Bay	110*	23	133

*To Anchorage and Fairbanks

The new circuits provided by the proposed satellite links are intended to supplement the backbone state network and to augment the existing communications to the other states. This first phase implementation would not directly improve communications in the rural areas, although it would increase the access of a rural area to all of the urban centers once the rural area has been linked to a toll center.

In a second phase, RCA proposes to begin replacing existing tropo links with satellite facilities. In this step nine additional earth stations would be added to the five stations proposed in this application. These stations (see Table 2 and Figure B) would be located at the following sites:

Table 2

Site	Proposed Satellite Circuits - 1976
Adak	30- 40
Bethel	60- 75
Big Mountain	180-210
Kalakaket	200-230
Kodiak	90-110
Kotzebue	75- 95
Nome	60- 75
North River	25- 35
Shemya	20- 30

The proposed circuits reflect both military and civil projected requirements. However, RCA makes it clear that commercial traffic alone is not expected to be able to support these stations and they state that they would not apply for authorization for these nine stations without firm agreements with U.S. government representatives, particularly the military, to make use of sufficient capacity to justify the establishment of the stations.

In the amended application, RCA proposes to offer ITV services utilizing the 2.5-2.69 GHz downlink band allocated by the World Administrative Radio Conference in Geneva to the broadcasting satellite service. RCA states that it is prepared to offer instructional TV and radio services in this band, provided that a sufficient market develops for such services. This capability would not be available in the first two operational satellites.

In order to utilize relatively inexpensive earth station terminals (RCA quotes a 7-foot antenna, receive-only terminal at $1,000.) it proposes to use a satellite EIRP of 52.8 dBW in order to obtain TASO Grade 2 television reception. This EIRP would exceed the satellite power flux density limits defined by the Final Acts, WARC, 1971, Geneva and it would be necessary to obtain a waiver of these limits from the FCC before such a service could be initiated. This proposal (added in the amended RCA filing) for the use of the 2.5 GHz band for a downlink for ITV service appears to be identical with the original proposal by Fairchild Hiller for the provision of this service.

RCA proposes to design the spacecraft to provide at least two ITV channels with the required high EIRP, provided (a) sufficient demand is demonstrated, and (b) the FCC waives the power flux density limits. A steerable spot beam with 3.6 degrees beamwidth would be used. Since this service is proposed for Alaska, Appalachia or Rocky Mountain States, it must be assumed that it would have to be time-shared if all of these regions choose to participate, since the beam could not cover all of them simultaneously.

RCA does not propose to furnish the terminals for this service, but would negotiate to provide them if the users so desired.

RCA states that charges for these (ITV) services would be developed in accordance with costs. Thus it would appear that RCA does not consider the provision of ITV and radio services to small communities in Alaska to be in the same category as the provision of satellite channels for non-commercial educational networks (ETV and Public Radio Services) since the latter are discussed separately and potential charges are discussed differently. RCA states it would provide the latter free of charge, if so directed by FCC policy and if it provides satellite services for the commercial networks. Otherwise it would charge reduced rates on an incremental basis.

4. Fairchild Domestic Satellite Application

Fairchild proposes to put 2 satellites in orbit (one operational and one spare-in-orbit) located at 104°W and one at 115°W. Each satellite would have 96 wide-band channels (transponders). The operational satellite would offer 72 channels for CONUS use and 24 channels for "offshore" coverage. "Offshore" service would provide six narrow-beam (0.6° @ 4 GHz) channels to each of the following locations:

a. Alaska*
b. Hawaii
c. Puerto Rico
d. Panama Canal Zone

Of the 6 channels to each "offshore" location, it is proposed that 2-4 TV channels fed from one CONUS location be provided, as well as 2-4 channels of message service. However, Fairchild does not propose to provide any offshore earth stations. The message channels can be used to connect with CONUS or to provide intra-Alaska coverage. If intra-Alaska coverage is most important, the beam may be "spoiled" by 3dB and the power to selected channels increased by 3dB in order to provide adequate coverage.

Fairchild also proposes to provide free space segment service and free operational backup for ITV services. This would consist of 1-2 ITV channels operating in the 2.5-2.69 GHz band directly to low-cost (approximately $2000) terminals for school or community use. The satellite antenna beamwidth would provide coverage to most of Alaska with 7-foot ground terminal antenna size. The remainder of the state could be served with the same quality of performance with slightly bigger antennas (10-12 feet). It will be possible to provide both channels to the same location or one to Alaska and the other to another location, such as Hawaii or the Rocky Mountain States. It is stated that NASA and Stanford University have been developing an antenna and a low-cost receiver which would be suitable for this service. Fairchild does not propose to supply the earth terminals.

Fairchild also proposes to supply free the space segment for a random access, single-voice channel per carrier system to provide telephone service to small users in the Alaska bush. This system would provide 100 voice circuits to a network of several hundred stations using small terminals (12-foot antennas with uncooled front ends) costing about $25,000 apiece. This system would operate with narrow-band (100KHz) RF carriers each carrying a single voice channel. These carriers would be assigned and utilized on demand by stations with message traffic. RF carriers would be suppressed unless actually carrying speech, in order to conserve satellite power. As proposed by Fairchild, the satellite would be especially designed for this service. Each satellite would carry 100 narrow-band transponders operating into a spot-beam, 30-foot satellite antenna.

Fairchild proposes to use the 2150-2200 MHz band for the uplink and the 2500-2550 MHz band for the downlink. Since this proposal was made, the Final Acts, WARC, Geneva, 1971 have revised the allowable assignments in the 2500-2690 MHz band. WARC approved, for remote-area, demand-assigned, multiple-access, thin-route satellite communications in regions 2 and 3, the bands 2500-2535 MHz for uplink and 2655-2690 MHz for downlink. It is assumed that Fairchild will modify its proposal accordingly.

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*Alaska is not completely covered.

It should be noted that both of Fairchild's proposals (for ITV service and for remote area message services) utilizing the 2500-2690 MHz band would exceed the power flux density limitations imposed by the WARC. Thus, it would be necessary to request the FCC to waive these limitations before approval could be obtained to implement them.

The Fairchild proposal for demand-assigned, thin-route message service in the 2.5 GHz band will require the design of a new type of narrow-band special-purpose transponder. Other systems, such as SPADE, use the wideband, 40 MHz, transponder which can also be used for TV transmission. The Fairchild approach results in more efficient use of the power capacity of the satellite, since it avoids the need for a "backoff" from saturation power output to hold intermodulation distortion to within acceptable limits, but at a higher cost and a need to develop sapce hardware.

Fairchild is the only applicant for the domestic satellite who makes an attempt to find a solution to the problem of Alaska remote community communications. Although the details of the Fairchild approach need careful examination and the use of digital rather than analog techniques should be considered, the willingness to address the problem is encouraging. However, Fairchild subsequently filed a second application for an additional, different program distribution system to serve the TV networks. This system uses smaller satellites (less than 1/3 the weight) than those proposed initially, and thus it does not have the capability of the first system. For example, the smaller satellites will have 4.5-foot antennas instead of 30-foot antennas and, thus, could not provide remote village coverage for Alaska with small earth terminals. It would only provide for the distribution of television broadcast program material to Alaska, Puerto Rico and Hawaii by spot beams operating with 29-foot receive-only earth stations.

5. MCI Lockheed Domestic Satellite Application

In its reply comments Lockheed states that, if authorized to do so, it would amend its application to provide intrastate service to Alaska. It would do this by providing for two switched 12/14 CHz transponders of 36 MHz-bandwidth to be used for TV or voice carriers. MCI Lockheed claims that the use of high-satellite EIRP and frequencies in the 12/14 GHz bands will result in reduced earth station complexity and cost and will make it easier to provide service to bush communities. It estimates that a 10-foot earth station providing 12 duplex voice circuits and one TV receive channel would cost about $150,000. A smaller bush station, providing 2 voice channels and one TV receive channel is estimated to cost $75,000, in quantity. A station for urban areas with TV transmit capability as well as 240 duplex voice channels would need a 32-foot antenna and would cost about $800,000.

MCI Lockheed claims that the flexibility introduced by the capability to switch transponders on ground command will be very useful in providing services to Alaska. It envisages the use of multiple access techniques whereby up to 20 locations could share up to 240 duplex channels in a single transponder.

6. NASA Study

In this study,[1] NASA proposes a dedicated satellite communication system for Alaska to provide a simplex (broadcast) television service, as well as duplex voice communications between remote "bush" locations. It assumes that existing and planned commercial services will provide adequate intercity trunking within Alaska, and to the lower 48 States.

The study considered as candidate satellite systems nearly all of the existing and planned commercial, experimental and military satellites. Tradeoff of cost with performance and available services was examined. A number of constraints and potential problem areas were identified. These included choice of operating frequency and the problems of operating small terminals in the bush.

The proposed system is intended to reflect a minimal cost approach. It provides one television channel for TV broadcasting to remote areas of the State and includes an option for a single telephone circuit to each remote "bush" terminal.

The study recommends the use of the 4/6 GHz band, although it mentions that the 2 GHz band should be reconsidered if a favorable recommendation is made by WARC for the use of this band. The study was performed before the WARC was convened. The reasons for the choice for the 4/6 GHz band were:

a) it was at that time the only internationally approved frequency band

b) flight qualified satellite hardware is available and development is minimized

c) ground terminal hardware is being rapidly developed.

A modified version of the TELESAT satellite was chosen because of its low procurement and launch cost. However, the low procurement cost was based on the assumption that it would be possible to take advantage of the ongoing Canadian program. Proposed modifications to the TELESAT satellite are:

a) antenna modification to cover Alaska (narrower, symmetrical beamwidths) with a 5-foot reflector

b) higher power (parallel operation of TWT's for TV)

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[1] Communication Satellite System for Alaska, Goddard Space Flight Center, NASA, March 1971.

The satellite would provide two transponders with full redundancy. One redundant transponder would have four power amplifiers in parallel for TV and the other redundant transponder would use a single power amplifier to provide 50 voice channels in a demand assignment system. Thus, only four of the ten transponders of the TELESAT satellite would be retained although all of the ten TWT power amplifiers would be used.

The study recommends a minimal cost-sparing concept with the operational satellite in orbit and one spare on the ground. The plan is to launch the spare whenever one transponder fails on the operational satellite. It is estimated that it might take six months to get delivery of a launch vehicle and to arrange for launch pad availability.

The satellite would be located over the Pacific between 125°W longitude and 150°W longitude to optimize the coverage in Alaska.

The ground segment is assumed to consist of one 32-foot central earth station which transmits television and acts as central control for the demand-assigned voice circuit network and 150 bush terminals capable of receiving TV with an option for one duplex voice channel. The bush terminals are located at the user facility. These terminals have 15-foot antennas with uncooled receivers, providing a G/T of 20 dB/°K. The estimated annual cost of such a system is given as $7.65 million.

The demand assignment telephone channel proposed is a single-channel per carrier, FM system using FDMA. The 50 available channels are able to serve the 150 bush terminals by taking advantage of the relatively low utilization factor (about 35%) of a telephone channel carrying speech in order to use the satellite power more efficiently. The two-way voice circuit available at each terminal along with the one-way video would make it possible to consider the provision of interactive instructional TV as well as computer-aided instruction, in addition to providing communications for emergency and community support services.

7. Canadian Satellites

A. Canadian domestic satellite system (TELESAT)

As presently planned, the Telesat system will have satellites positioned at 109°W and 114°W. Canadian coverage area is defined so as to provide an EIRP of 33 dBW. According to Telesat officials, the effective EIRP at Anchorage and Fairbanks has been checked and would, in the worst case, be about 1 dB down. However, it would be much worse to the west and northwest of Anchorage. In addition, the visibility of the satellite from all locations in Alaska must be considered. The satellite located at 109°W would give look angles indicated in Table 3 for selected locations in Alaska.

Table 3

Look Angles to Satellite at 109°W

Site	Elevation Angle-degrees
Barrow	3.5
Kotzebue	5.0
Purdhoe Bay	6.0
Nome	4.7
Bethel	8.0
Fairbanks	11.0

The smallest terminals planned for use within the coverage area of the Telesat system use 15-foot antennas, and these are satisfactory only for voice service. For adequate TV reception, 26-foot antennas would heve to be used. Although at first glance the incremental cost of a 26-foot versus a 15-foot antenna may seem to be small, when such things as deicing, increased wind loading, increased maintenance problems and the need for large quantities are considered, it does not appear to be a practical solution.

A baseline tariff for an RF channel (transponder) plus some ground station equipment has been established at $3 million/year. No tariff for space segment alone (no ground equipment) has yet been established, but one could be if it is required.

There are a couple of political problems in providing service to Alaska with the Tellesat system. How serious an impediment they might be will depend upon the attitudes of the Governments of Canada and the United States. The problems are:

a) The Act to establish Telesat limits its authority to the provision of satellite telecommunications services on a commercial basis between locations in Canada. Telesat is specifically forbidden to negotiate with or to enter into agreement with representatives of a foreign state, except under the direction of or at the request of the Minister of Communications. Therefore, any such arrangement would have to be through inter-governmental agreement.

b) There is some question about whether the Canadian government would wish to enter into an agreement which might conflict with existing Intelsat agreements.

B. Canadian Communications Technology Satellite (CTS)

The CTS is a shared program in which NASA and the Canadian government participate. Canada contributes the major portion of the funding and NASA provides technological assistance. Launch is to be in 1975. The satellite will have a two-year life and will be available for experimental use only; there is no planned replacement. The arrangement is for 50% of the experiments to be planned by NASA. It is understood that NASA is requesting proposals for experiments.

The system will operate at 12 GHz and will include:

a) 2 8-foot TV receive terminals with TASO Grade 1 performance.

b) 5 2-foot voice-only terminals.

FIGURE A

COMSAT PLAN

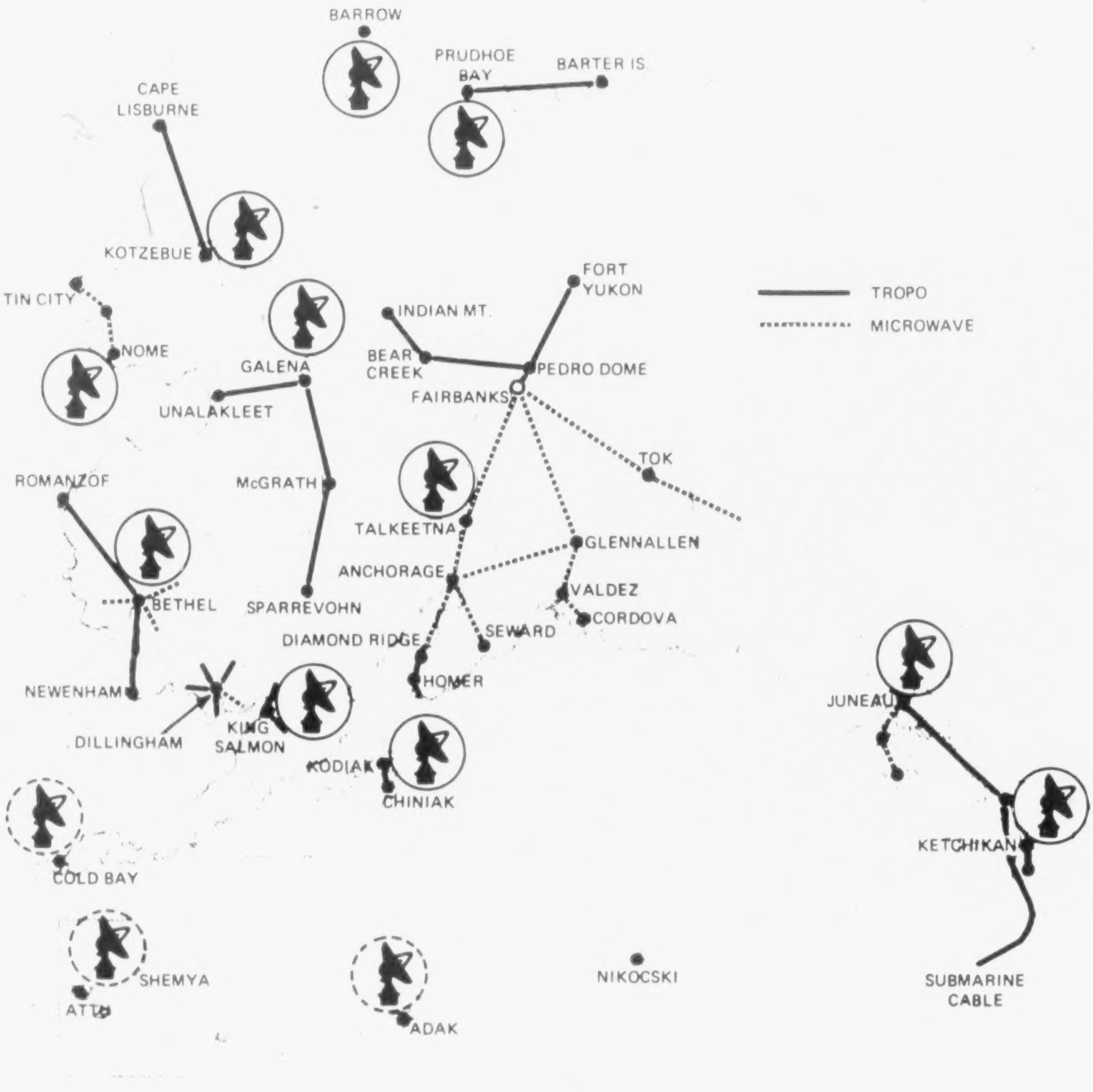
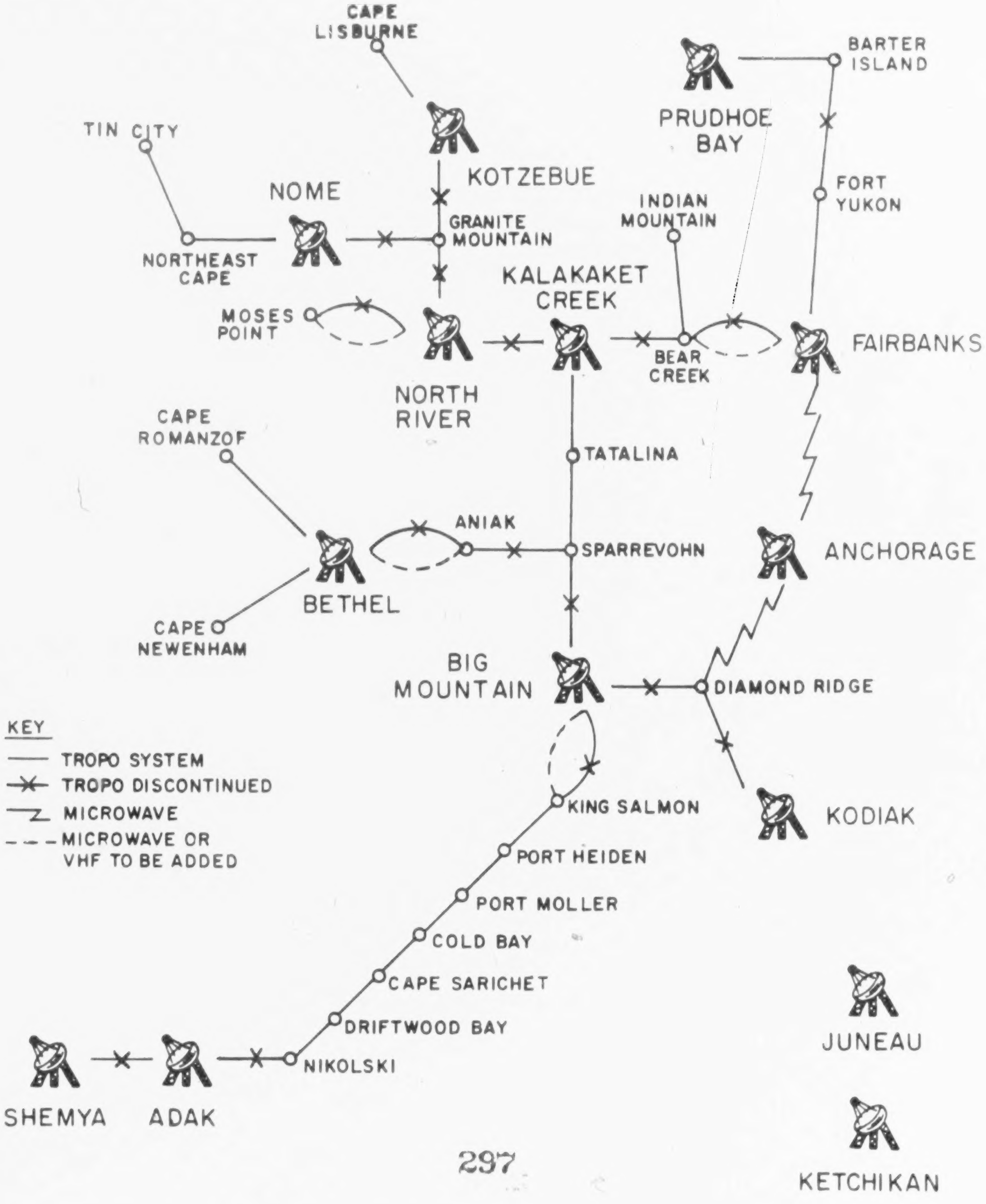

BARROW
PRUDHOE BAY
BARTER IS.
CAPE LISBURNE
KOTZEBUE
TIN CITY
NOME
GALENA
UNALAKLEET
INDIAN MT.
BEAR CREEK
PEDRO DOME
FAIRBANKS
FORT YUKON
TROPO
MICROWAVE
TOK
ROMANZOF
McGRATH
TALKEETNA
GLENNALLEN
ANCHORAGE
VALDEZ
CORDOVA
BETHEL
SPARREVOHN
DIAMOND RIDGE
SEWARD
HOMER
NEWENHAM
DILLINGHAM
KING SALMON
KODIAK
CHINIAK
JUNEAU
KETCHIKAN
COLD BAY
SHEMYA
ATTU
ADAK
NIKOCSKI
SUBMARINE CABLE

FIGURE B

RCA PLAN


CAPE LISBURNE
BARTER ISLAND
PRUDHOE BAY
TIN CITY
KOTZEBUE
NOME
FORT YUKON
INDIAN MOUNTAIN
GRANITE MOUNTAIN
NORTHEAST CAPE
KALAKAKET CREEK
MOSES POINT
BEAR CREEK
FAIRBANKS
NORTH RIVER
CAPE ROMANZOF
TATALINA
ANIAK
SPARREVOHN
ANCHORAGE
BETHEL
CAPE NEWENHAM
BIG MOUNTAIN
DIAMOND RIDGE
KEY
TROPO SYSTEM
TROPO DISCONTINUED
MICROWAVE
MICROWAVE OR VHF TO BE ADDED
KING SALMON
KODIAK
PORT HEIDEN
PORT MOLLER
COLD BAY
CAPE SARICHET
JUNEAU
DRIFTWOOD BAY
NIKOLSKI
SHEMYA
ADAK
KETCHIKAN

ANNEX D-2

MULTIPLE ACCESS DEMAND ASSIGNMENT (MADA) TECHNIQUES

The requirement to provide two-way communication among a large number of remote villages, when each village can only support 1-3 telephone channels, suggests the use of multiple access, demand assignment techniques. With the use of such techniques, it is possible for a satellite capable of providing a limited number of voice channels to be able to serve a large number of stations having a total number of channels far in excess of the satellite maximum capacity. This is possible because each station is given access to a voice channel only when it needs it. When a call is completed the circuit is returned to the common pool to be used by another station on demand. Thus, the number of circuits provided is determined by the maximum number of simultaneously active channels out of the total number in the system.

A further saving of satellite power (or a reduction in satellite capacity) can be achieved by taking advantage of the fact that during a two-way telephone conversation, the circuit in each direction only carries speech power for about 35% of the time, due to speech characteristics, speaking habits and telephone working practice. Transatlantic cables take advantage of this to increase the number of users per circuit, using a system called TASI. In a satellite system, where satellite power is at a premium, it is more common to use this fact to reduce the satellite power per circuit, by turning on the carrier only when speech is being carried.

A MADA system for satellite use is now operational in the international INTELSAT system. This system (called SPADE) can provide 800 circuits through a satellite transponder, making available 400 two-way channels. SPADE uses PCM and 4-phase PSK to modulate the voice channel on the RF carrier. The digital modulation format allows satellite bandwidth to be conserved.

The demand assignment signalling and switching system used in SPADE is quite complex and costly because it was considered necessary in an international system for every station to have complete autonomy in making channel assignments. Another feature which contributes to the cost and complexity of SPADE equipment is the requirement that it interface with a CCITT No. 5 signalling system. The cost to equip an existing standard INTELSAT earth station with a SPADE terminal with 12-channel capacity is nearly $400,000. This is of course prohibitive for thin-route, remote-area stations of the type needed in rural Alaska. However, a modified version of SPADE with much less sophistication and greatly reduced cost might be considered.

SPADE can be made much cheaper by:

a) The use of delta-modulation instead of PCM. The delta codec is simpler, smaller and cheaper to build, than a PCM codec. It is also about two orders of magnitude less sensitive to bit errors.

b) The use of a centralized control instead of a specialized demand assignment and signalling system with a specialized computer. With central control calls may be set up in various ways, such as the use of a common channel to access central or a polling system. The type used would depend on the system requirements.

c) For an internal system which does not have to access other commercial telephone systems a simple signalling system could be used.

It is estimated that a modified SPADE system providing 2-3 two-way telephone channels through a small station with a 10-15 foot antenna, an uncooled receiver and a 300-watt TWT could be provided for about $40,000-$50,000 per terminal, exclusive of station power supply. About 1-2 kilowatts of prime power would be needed.

For a large procurement (several hundred), a very basic system providing a single channel might be obtained for $10,000 to $15,000.

The terminals discussed above could also provide a TV receive capability. The video carrier would use analog FM modulation.

ANNEX D-3

DATA BASE ON EXISTING TELECOMMUNICATIONS FACILITIES AND PLANS FOR RURAL COMMUNITIES

A. RCA FIRST YEAR PROGRAM - BUSH SITES MAP

B. RCA BUSH SITES LISTING

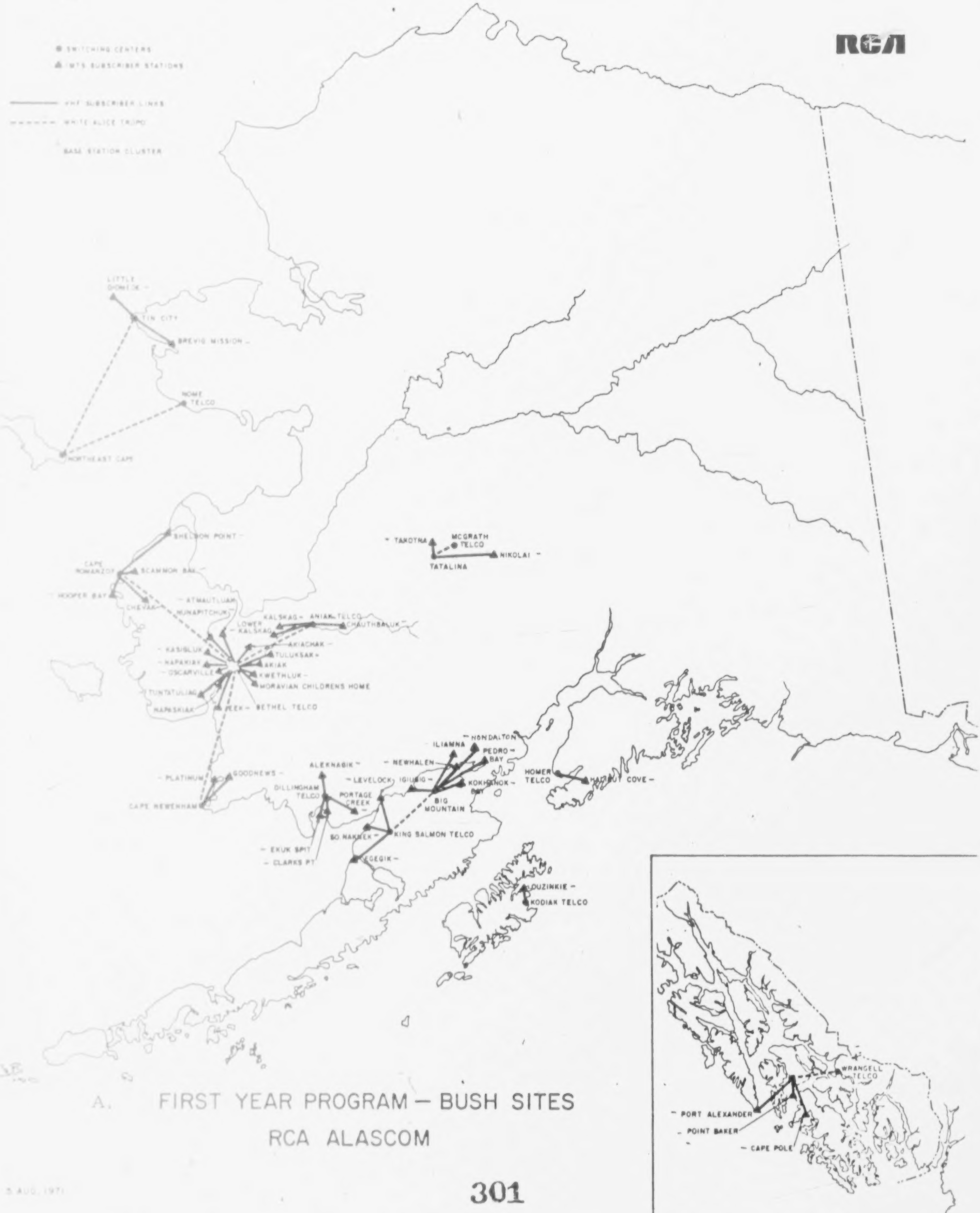
C. 1971 STATE UTILITY CONFERENCE DISCUSSION

D. ACS SYSTEM

E. POSSIBLE NON-COMMERCIAL AM RADIO BROADCAST NETWORK PROPOSED BY HAMMETT & EDISON CONSULTING ENGINEERS 1971

F. POSSIBLE NON-COMMERCIAL TELEVISION BROADCAST NETWORK PROPOSED BY HAMMET & EDISON CONSULTING ENGINEERS 1971

G. TELECOMMUNICATIONS MAP, RURAL ALASKA


RCA
● SWITCHING CENTERS
▲ IMTS SUBSCRIBER STATIONS
VHF SUBSCRIBER LINKS
WHITE ALICE TROPO
BASE STATION CLUSTER
LITTLE DIOMEDE
TIN CITY
BREVIG MISSION
NOME TELCO
NORTHEAST CAPE
SHELDON POINT
CAPE ROMANZOF
SCAMMON BAY
HOOPER BAY
CHEVAK
ATMAUTLUAK
NUNAPITCHUK
LOWER KALSKAG
KALSKAG
ANIAK TELCO
CHAUTHBALUK
AKIACHAK
TULUKSAK
AKIAK
KASIGLUK
NAPAKIAK
OSCARVILLE
KWETHLUK
MORAVIAN CHILDRENS HOME
TUNTATULIAK
NAPASKIAK
EEK
BETHEL TELCO
TAKOTNA
MCGRATH TELCO
NIKOLAI
TATALINA
PLATINUM
GOODNEWS
CAPE NEWENHAM
ALEKNAGIK
DILLINGHAM TELCO
PORTAGE CREEK
EKUK SPIT
CLARKS PT
LEVELOCK
IGIUGIG
NEWHALEN
ILIAMNA
NONDALTON
PEDRO BAY
KOKHANOK BAY
BIG MOUNTAIN
SO NAKNEK
KING SALMON TELCO
EGEGIK
HOMER TELCO
HALIBUT COVE
OUZINKIE
KODIAK TELCO
WRANGELL TELCO
PORT ALEXANDER
POINT BAKER
CAPE POLE

A. FIRST YEAR PROGRAM — BUSH SITES
RCA ALASCOM

5 AUG. 1971

B. RCA

BUSH PROGRAM

Communities Served	Base Stations
1. Tulaksak	Bethel Base Station
Aniak	Bethel Base Station
Aniakchak	Bethel Base Station
Kwethluk	Bethel Base Station
Moravian	Bethel Base Station
Oscarville	Bethel Base Station
Napakiak	Bethel Base Station
Napaskiak	Bethel Base Station
Kasigluk	Bethel Base Station
Nunapitchuk	Bethel Base Station
Atmautluak	Bethel Base Station
Chevak	Cape Romanzof Remote Base Sta.
Scammon Bay	Cape Romanzof Remote Base Sta.
Hooper Bay	Cape Romanzof Remote Base Sta.
Chauthbaluk	Aniak Remote Base Station
Lower Kalskag	Aniak Remote Base Station
Kalshag	Aniak Remote Base Station
Goodnews Bay	Cape Newenham Remote Base Sta.
Platinum	Cape Newenham Remote Base Sta.
King Salmon Service Area	
Levelock	King Salmon Base Station
So. Naknek	King Salmon Base Station
Egegik	King Salmon Base Station

King Salmon Service Area	Base Stations
Iguigig	Big Mountain Remote Base Sta.
Iliamna	Big Mountain Remote Base Sta.
Newhalen	Big Mountain Remote Base Sta.
Pedro Bay	Big Mountain Remote Base Sta.
Nondalton	Big Mountain Remote Base Sta.
Kakhonak	Big Mountain Remote Base Sta.
Dillingham Service Area	
Portage Creek	Dillingham Base Station
Ekuk	Dillingham Base Station
Clarks Point	Dillingham Base Station
Aleknagik	Dillingham Base Station
Kodiak Service Area	
Ouzinkie	Kodiak Base Station
Homer Service Area	
Halibut Cove	Homer Base Station
McGrath Service Area	
Nikolai	Tatalina AF Remote Base Sta.
Takotna	Tataline AF Remote Base Sta.
Nome Service Area	
Brevig Mission	Additions to existing Tin City remote Base Station
Diomede	
Petersburg Service Area	
Point Baker	Kushneahin Creek remote mountain top Base Station
Cape Pole	
Port Alexander	" "

Additions to Bethel Service Area	Base Stations
Eek	Bethel Base Station
Tuntutuliag	Bethel Base Station
Sheldon Point	Cape Romanzof Base Station

C. 1971 STATE UTILITY CONFERENCE DISCUSSION OF RCA BUSH TELEPHONE PLANS

Present communications service to rural communities of Alaska is far from adequate to meet the ever increasing business, educational and social needs of the developing State. Only a relatively few villages have even basic telephone services today. Many others, having no telephone communications, rely on short wave radio for contact with the outside world. This is usually on a once a day scheduled basis when 11 land radio stations strategically located around the state, meet schedules with village radio stations operated by the State or Federal school teachers, Public Health Service village aids or some privately licensed radio stations in the villages. Messages can be relayed through the land radio stations for transmission over teletype circuits to other parts of the state or the country. Telephone phone patch calls are occasionally possible when radio signals are strong. At times, radio signals are so poor that just getting a message through is difficult, if not impossible. The service has not really had the use by the village general public that it could have, mostly because of the difficulties involved with it. And, of course, there is no privacy whatsoever. Aside from the radio operators at each end of the circuit being involved with the call, tuning in on the radio schedules by anyone with a standard shortwave radio is a popular pastime in the villages and a substantial contributor to the famous "Mukluk Telegraph."

Public telephone service comparable to that enjoyed in more urban areas is a real need in the Bush. Apart from the obvious importance of having reliable service immediately available in times of emergency or personal urgency, furthering of the social and economic development of the village existence can be greatly enhanced through the addition of reliable telephone communications. Transportation and communication are two key factors to the development of any area. With transportation in the Bush poor at best by today's modern standards, most villages having only weekly or semi-weekly mail service, dependable telephone service must play an even more important role in rural Alaska.

When the U. S. Air Force solicited bids for the sale of the ACS system, the State recognized this need. They requested that in the governments Request for Offers, the official bidding document, the bidders consider in their proposals providing telephone service to 88 of the larger and more needing villages.

After cpnsiderable study of the problem, RCA concluded that significantly greater benefit to the economy and well being of the State's rural areas could be achieved by providing reliable telephone service to as many Bush villages as technically and economically feasible. To this end, RCA proposed in its Offer to Purchase to install dial telephone service in the form of a public telephone in each of 142 villages throughout the State. This number represents almost every duly constituted village in Alaska with a population of 25 or so not presently served by some form of 24 hour reliable telephone service.

Needless to say, this represents quite an engineering challenge. Most of these villages lie many miles from existing communications routes over some of the most formidable terrain and climatological conditions found anywhere in the world. Tocomplicate matters from an engineering standpoint, not all of the geological maps covering Alaska are up to date and a number are quite sparse in terrain detail, so important in planning microwave and VHF radio paths.

In RCA's plan, a community dial telephone connected to the nearest existing telephone exchange will be installed in a public location in each village such as a community store, post office or community hall. The host telephone exchange, in some cases, is located as far as 250 miles from villages to be reached with rugged, mountainous intervening terrain. To use telphone lines common in most areas of the country, would represent a considerable installation and maintenance expense and would not insure the reliability felt necessary. Instead, RCA will use combinations of microwave, Very High Frequency (or VHF) radio and where applicable, lease of channels from existing, government owned, communications facilities such as the White Alice System. Nearly 7,000 route miles of communications system are planned to reach into the "grass roots" of Alaska. This will be at an estimated cost of something over $7 million.

To best accomplish the task of reaching many villages with the most economical system, a cluster principal will be used. Where a number of villages are within a radius up to 50 miles of a central point of reasonably high elevation, a VHF radio base station will be constructed which will provide up to 4 radio channels to be available to each village on a common user or shared basis. These channels will be connected by way of multi-channel microwave or by leased voice channels to automatic control equipment in the nearest community with an existing telephone dial system. In this way, each village clustered about the common base station will be provided telephone service from the host exchange with the same capability as any local subscriber in the host exchange community. This will be true right down to the telephone number. The only difference here being that high reliability radio facilities will be used to cover the greater distance rather than telephone wires.

I should point out at this point that the word radio in this application should not be confused with the customary principal of shortwave radio operat ion where one party on the call must standby while the other is transmitting and vice versa. Radio in this program is merely the medium used to convey voice from one point to another but will be arranged so that the parties will have simultaneous duplex capability the same as any dial telephone in any city. To the village user, his telephone will do anything that yours or mine in our homes will, including Direct Distance Dialing when this feature is fully available throughout the State. His telephone will be a private single party line from the host community telephone exchange.

To reach beyond the communications main lines now existing, a number of multi-channel systems will be required. Since the links of microwave and VHF are, for the most part, limited to line of sight distances, a number of remote repeater stations will be required to tandemly extend the telephone circuits over the distances necessary to reach the remote base stations. The routing of these systems will follow a course such that VHF base stations can be used in each repeater to cluster villages along the route. These repeater stations constitute the most challenging aspect of the program.

To gain the path distances and clearance above intervening terrain required for microwave, these sites will have to be located at relatively high elevations. This means mountain tops and mountain tops mean helicopters.

The repeater stations will, of course, be unattended. This then demands that the highest reliability possible be built into every component of the sites. With the new solid state microwave and VHF radio equipment now commonly available, this doesn't present too great a problem since Mean Time Between Failures of many thousands of hours can be readily obtained. This coupled with complete back-up redundance planned and telemetry remote control and alars features are expected to produce the desired reliability of 99.9%. The problem of obtaining reliable primary power however, presents a somewhat different picture. RCA hopes to achieve one year unattended operation between maintenance visits. This precludes the use of diesel generators and other common power sources. Instead, Thermoelectric Generators power system burning propane fuel will be used. These produce electrical energy sufficient for the small demands of the solid state radio equipment with no moving parts and infrequent maintenance required. Additionally, battery back-up reserve for 24 hour full load drain will be provided.

Heat from the Thermoelectric Generators is used in a unique design which maintains the inside temperature of the shelter housing the station well within the operating range of the equipment over an outside extreme range of from -100°F. to +105°F. and under wind velocities in excess of 100 MPH. Wind survivability specifications is 200 MPH with one inch radial ice.

The propane fuel systems also incorporate a unique feature. Since the pressure of propane diminishes with lowering temperatures to a point where it would be insufficient to operate the generators, external pressure is added to the fuel tanks from a nitrogen gas system when the temperature becomes excessively low. And instead of obtaining gaseous fuel from the fuel tanks, as is commonly the case with propane, the fuel feed is liquid. When the liquid propane reaches the inside of the shelter, it is evaporated in a gas generator extracting heat from the Thermoelectric Generators.

The environment extremes may seem excessive to some. Temperatures as low as -70°F. or winds approaching 100 MPH have been recorded in some parts of Alaska. But these figures are usually obtained from environmental recording stations that are relatively sheltered in comparison to exposed mountain tops. Very little data is available to indicate what the worse conditions that might be experienced on the mountains are. We hope not as severe as are designed for.

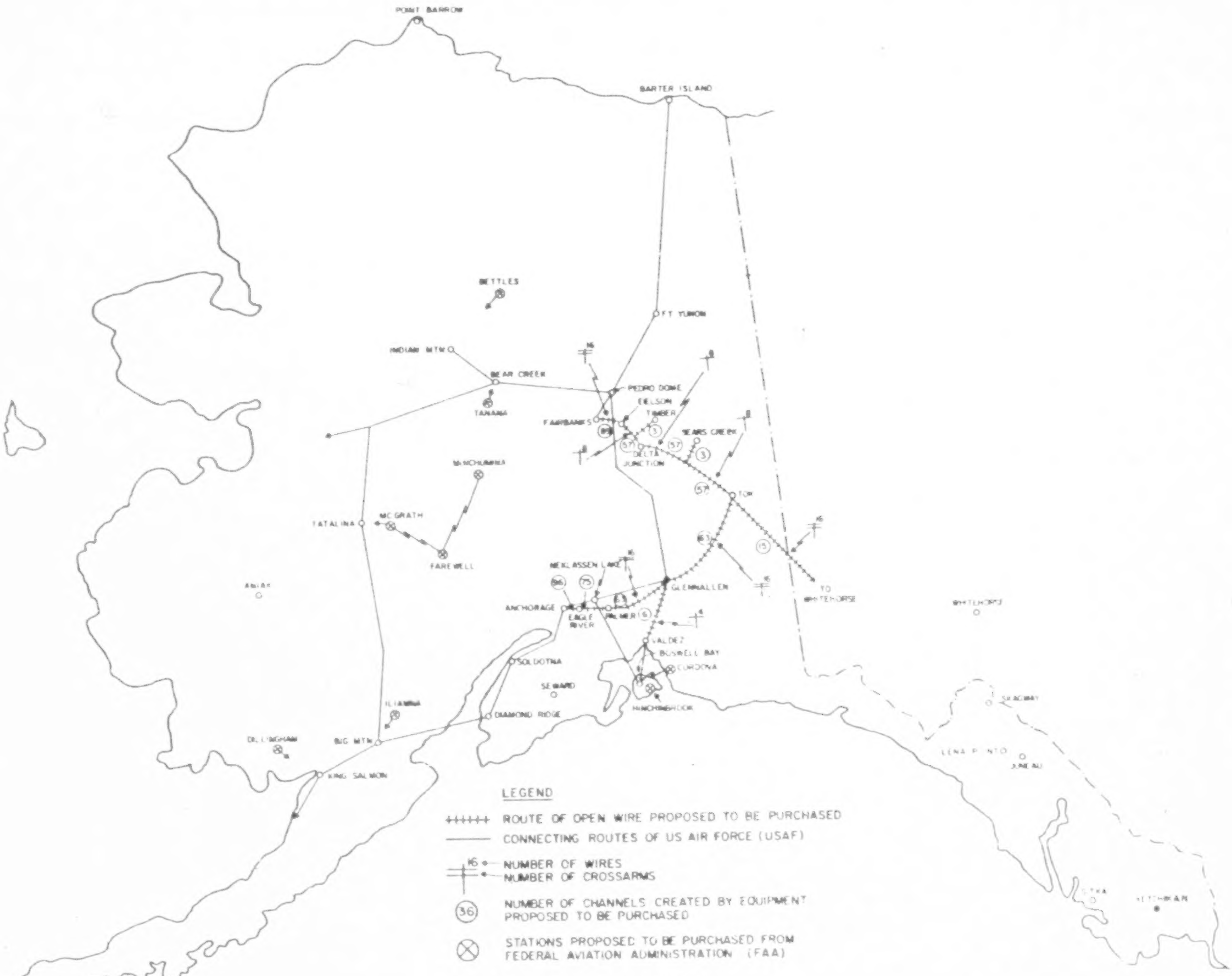
Once the channels from the host telephone exchange have been delivered to the remote base stations, the question arises as to how they will be distributed to the villages in each cluster. This will be accomplished by using a technique developed by the Bell System called improved Mobile Telephone Service (IMTS). IMTS is a sophisticated, random multiple access, VHF radio switching system designed to provide fully automatic, Direct Distance Dialing, private line telephone capability to a large number of subscribers over a relatively small number of voice channels. It was designed primarily to permit greater utilization of the few radio channels available to mobile service in the larger cities while also providing the advantages of full dial capability to mobile users. The IMTS concept is ideally suited to Alaska's rural areas in that it will afford modern, fully automatic telephone service, not only to the villages in the immediate plans, but to many other future telephone subscriber services with no expansion requirement to the basic ommunications network. With the system planned, dial telephone service will be almost immediately available to any activity such as prospecting or geophysical groups, mining camps, coastal and river vessels, fire fighting teams, seasonally occupied and other locations where reliable service is required, but where time and/or cost of installing permanent facilities cannot be justified. This would include, of course, road construction crews in areas near the villages provided service by this system.

Calls to and from the host community, or between villages connected to the same exchange, can be dialed by a village user as though making a local call. Long distance calls to and from any other area are accomplished in the same manner as for any telephone within the host community. Miscellaneous and mobile subscribers as mentioned earlier can either have full dial service as do the villages, or may be afforded manual operator services using the long distance operators for assistance. The system is also designed to convert any village, later adding a telephone exchange of their own, to long distance toll service rather than subscriber line service without requiring changes to the basic system.

One enterprising manufacturer of radio equipment has even suggested, and I understand pursuing, the possibility of a unique new market in the Bush. He envisions snow mobiles with small mobile radios that can be in almost constant telephone contact while on hunting trips or traveling between villages. Don't laugh! With the tremendous boom snow-go's have experienced in the north, he may just find a bonanza.

> "Hello dear, will you stop by Kuguruk Creek on the
> north forty on your way home and pick up a moose
> for supper!"

The IMTS concept to be used will meet the requirements of a variety of different telephone needs well into the future within the design capability initially installed. No other communication technique can provide this versatility.


POINT BARROW
BARTER ISLAND
BETTLES
FT YUKON
INDIAN MTN
BEAR CREEK
TANANA
PEDRO DOME
EIELSON
TIMBER
FAIRBANKS
BEARS CREEK
DELTA JUNCTION
TOK
McKINLEY PARK
TATALINA
MC GRATH
FAREWELL
ANIAK
MEIKLASSEN LAKE
GLENNALLEN
TO WHITEHORSE
WHITEHORSE
ANCHORAGE
EAGLE RIVER
PALMER
VALDEZ
BOSWELL BAY
CORDOVA
SOLDOTNA
SEWARD
HINCHINBROOK
DIAMOND RIDGE
ILIAMNA
BIG MTN
DILLINGHAM
KING SALMON
SKAGWAY
LENA POINT
JUNEAU
SITKA
KETCHIKAN
16
8
4
3
5
6
15
53
57
63
75
86
LEGEND
ROUTE OF OPEN WIRE PROPOSED TO BE PURCHASED
CONNECTING ROUTES OF US AIR FORCE (USAF)
NUMBER OF WIRES
NUMBER OF CROSSARMS
NUMBER OF CHANNELS CREATED BY EQUIPMENT PROPOSED TO BE PURCHASED
STATIONS PROPOSED TO BE PURCHASED FROM FEDERAL AVIATION ADMINISTRATION (FAA)

D. ACS SYSTEM

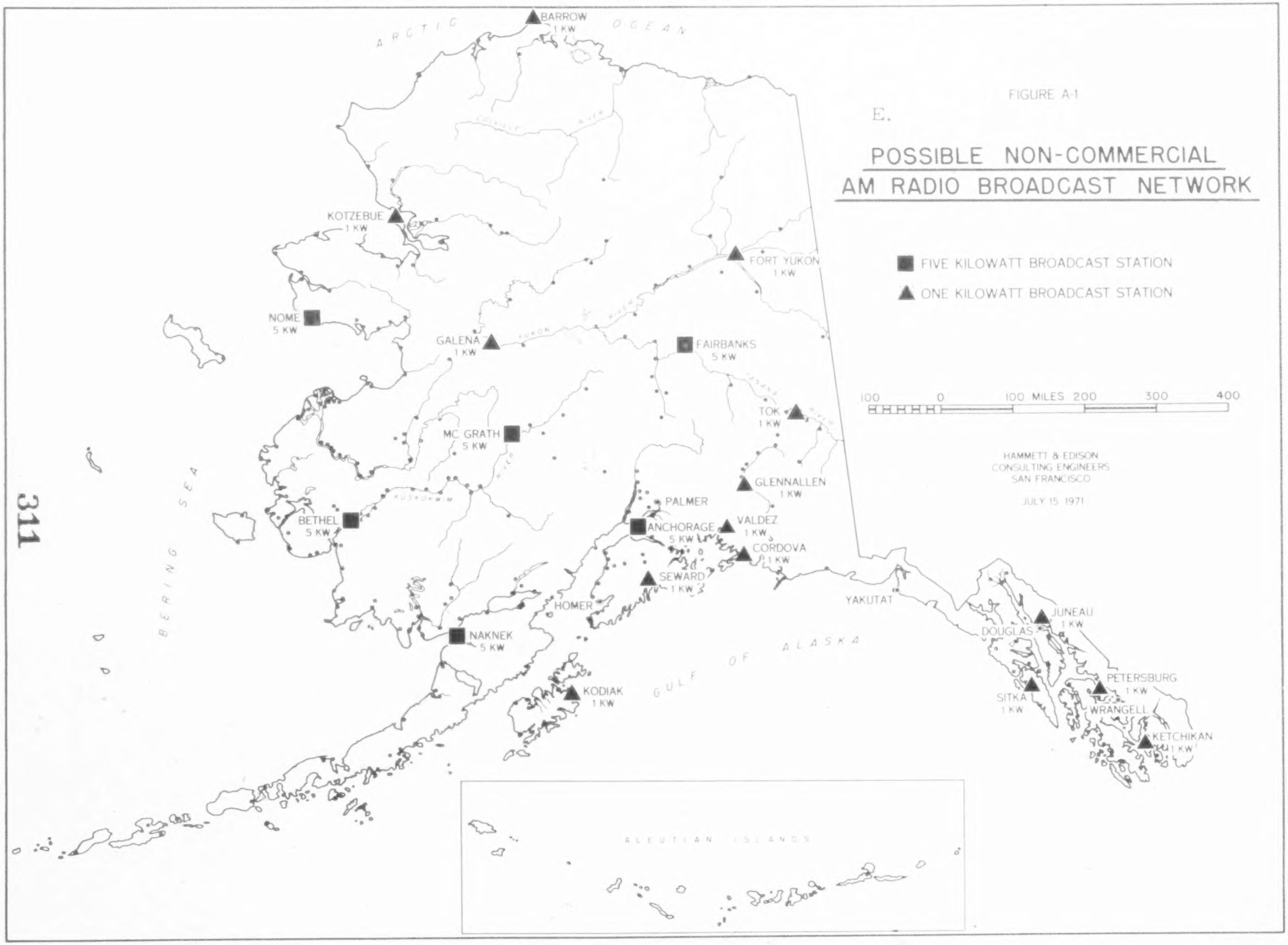
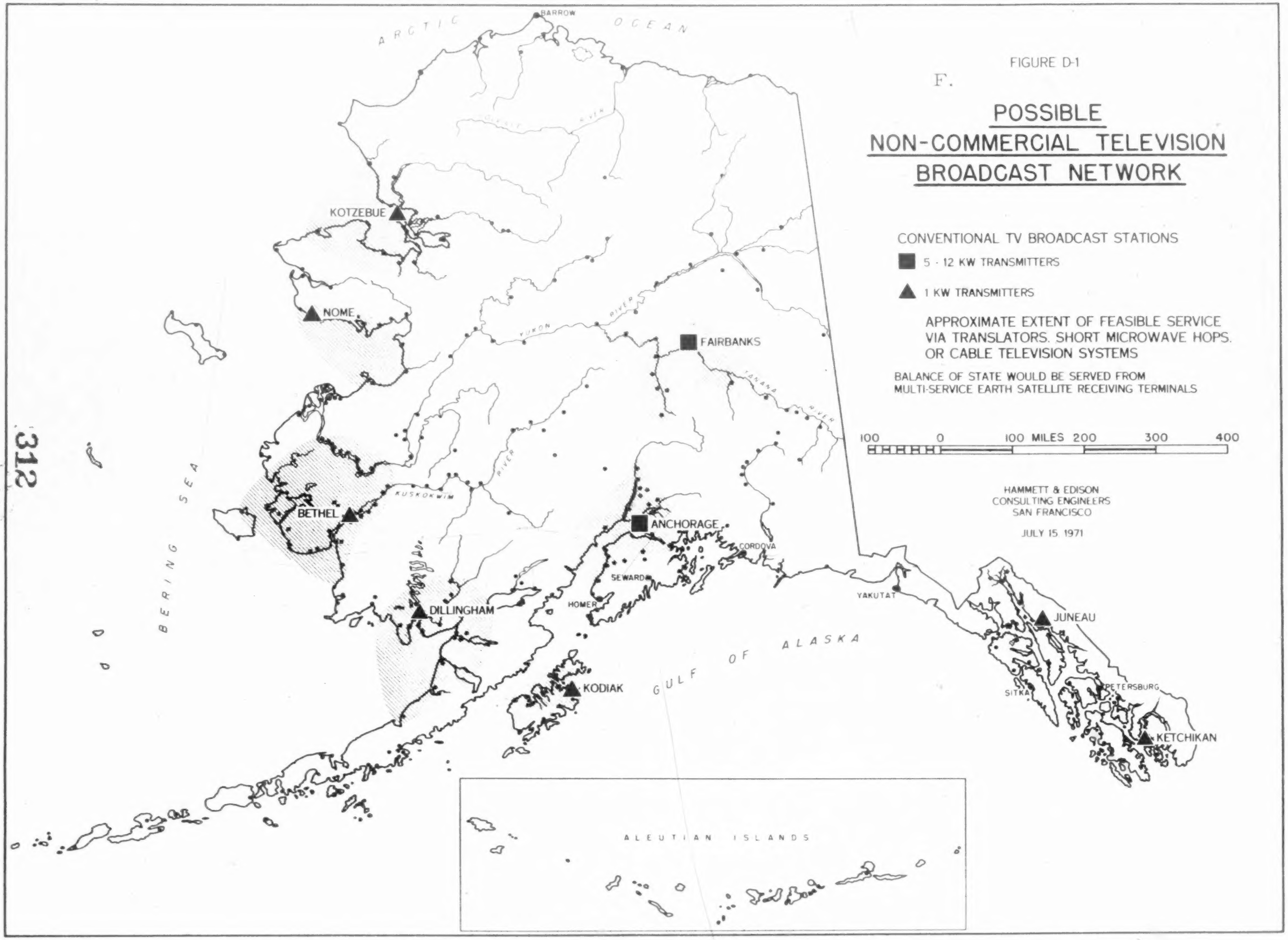


FIGURE A-1

E.

POSSIBLE NON-COMMERCIAL AM RADIO BROADCAST NETWORK

■ FIVE KILOWATT BROADCAST STATION
▲ ONE KILOWATT BROADCAST STATION
100 0 100 MILES 200 300 400
HAMMETT & EDISON
CONSULTING ENGINEERS
SAN FRANCISCO
JULY 15 1971
ARCTIC OCEAN
BERING SEA
GULF OF ALASKA
ALEUTIAN ISLANDS
BARROW 1 KW
KOTZEBUE 1 KW
NOME 5 KW
GALENA 1 KW
FORT YUKON 1 KW
FAIRBANKS 5 KW
TOK 1 KW
MC GRATH 5 KW
GLENNALLEN 1 KW
PALMER
ANCHORAGE 5 KW
VALDEZ 1 KW
CORDOVA 1 KW
SEWARD 1 KW
BETHEL 5 KW
HOMER
NAKNEK 5 KW
KODIAK 1 KW
YAKUTAT
JUNEAU 1 KW
DOUGLAS
SITKA 1 KW
PETERSBURG 1 KW
WRANGELL
KETCHIKAN 1 KW
YUKON RIVER
KUSKOKWIM
COLVILLE RIVER
TANANA RIVER



ARCTIC OCEAN
BARROW
KOTZEBUE
NOME
BETHEL
DILLINGHAM
KODIAK
ANCHORAGE
FAIRBANKS
CORDOVA
SEWARD
HOMER
YAKUTAT
JUNEAU
SITKA
PETERSBURG
KETCHIKAN
YUKON RIVER
TANANA RIVER
KUSKOKWIM RIVER
COLVILLE RIVER
BERING SEA
GULF OF ALASKA
ALEUTIAN ISLANDS
100 0 100 MILES 200 300 400

FIGURE D-1

F.

POSSIBLE NON-COMMERCIAL TELEVISION BROADCAST NETWORK

CONVENTIONAL TV BROADCAST STATIONS

■ 5 - 12 KW TRANSMITTERS

▲ 1 KW TRANSMITTERS

▨ APPROXIMATE EXTENT OF FEASIBLE SERVICE VIA TRANSLATORS, SHORT MICROWAVE HOPS, OR CABLE TELEVISION SYSTEMS

BALANCE OF STATE WOULD BE SERVED FROM MULTI-SERVICE EARTH SATELLITE RECEIVING TERMINALS

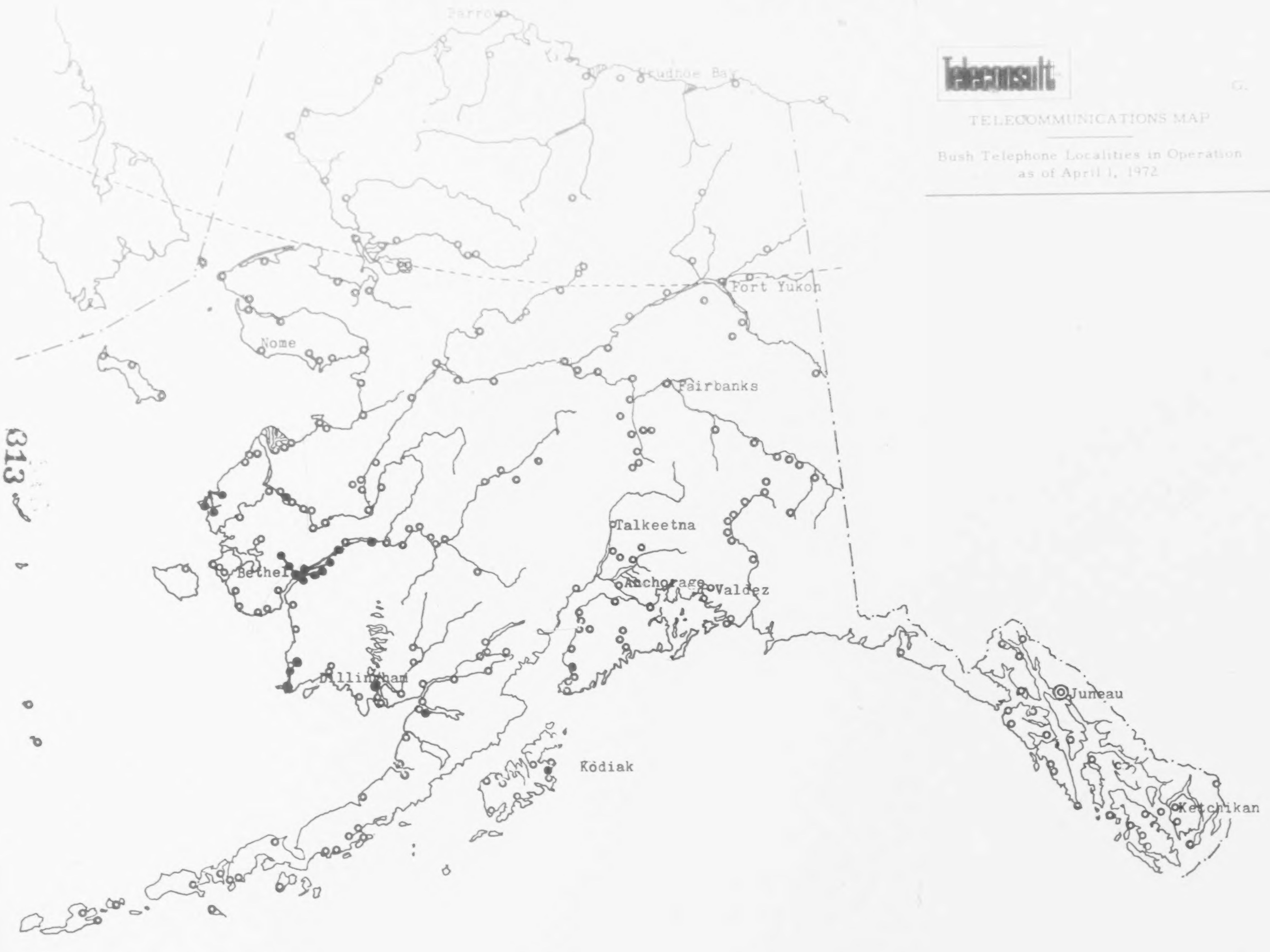
HAMMETT & EDISON
CONSULTING ENGINEERS
SAN FRANCISCO

JULY 15 1971

Teleconsult G.

TELECOMMUNICATIONS MAP

Bush Telephone Localities in Operation
as of April 1, 1972


Barrow
Prudhoe Bay
Fort Yukon
Nome
Fairbanks
Talkeetna
Bethel
Anchorage
Valdez
Dillingham
Kodiak
Juneau
Ketchikan

ANNEX D-4

DATA BASE ON EXISTING ELECTRIC POWER FACILITIES AND PLANS FOR RURAL COMMUNITIES

A. THE ALASKAN VILLAGE ELECTRIFICATION PROGRAM-AVEC/REA

B. ELECTRIC POWER SUPPLY MAP, RURAL ALASKA

A. THE ALASKAN VILLAGE ELECTRIFICATION PROGRAM - AVEC/REA

Organization

The Alaska Village Electric Cooperative (AVEC) was established as a means of bringing central station electric service to the small native villages in Alaska which individually could not operate, maintain or financially support such service. The close cooperation, imput and continuing support of several Federal and State agencies make this unique project possible.

The electric consumers are member-owners of the nonprofit cooperative. Each village served elects delegates to represent it at the AVEC annual meetings where seven (7) directors are elected from the delegates to serve on the board of directors. The board in turn employs the manager and makes the usual policy decisions.

Selection of Villages to be Electrified

The selection of the villages to be electrified is based upon the criteria set by the board of directors at its meeting of November 27-30, 1967.

For a village to qualify to receive electric service, the people of the village must comply with the following conditions:

1. A request for assistance in obtaining electric service must be presented to the cooperative by the village governing body.

2. At least eighty percent of all residential and commercial establishments in the community must have applied for electric service and must have complied with the conditions of membership as provided in the bylaws.

3. The residents of the village must agree to assist in the construction of electric facilities to the extent of their capabilities and as specified by the cooperative without cost to the cooperative as agreed upon between the governing body and the cooperative. On June 13, 1968, this was amended by the board of directors to pay each village $200 for each member connected to the lines of the cooperative.

4. The village governing body must nominate at least four persons willing and able to take training in the operation and maintenance of an electrical system.

5. The village council must take action for any necessary voter approval granting or agreeing to grant (a) any necessary rights-of-way or easements at no cost or (b) furnishing fee-simple title or acceptable leases to land adequate for a generating plant site acceptable to the cooperative at no cost to the cooperative. In case where land rights must be obtained from the state or federal government, the village must agree to cooperate fully with the cooperative in taking any action necessary to obtain title or lease.

6. The board of directors must determine the stability of population and permanent location of each village.

In addition to the qualifications for service previously outlined, the following criteria will be considered by the Alaska Village Electric Cooperative, Inc., board of directors:

1. The cooperative will determine the existence of a prevailing economy or potentially viable economic base in the village capable of supporting an electric utility.

2. The advisory committee and other expert sources will be consulted in making this determination.

The potential opportunity to receive service will be made known to all unserved villages by advertising in newspapers and other media and by such other methods as may be necessary to reach all interested villages. The dissemination of this information will include a complete list and explanation of the criteria for service contained herein.

Villages Served

There are presently 44 villages receiving AVEC service. Two of these are served by tielines from neighboring villages. Kalskag is served from Lower Kalskag and Kasigluk is served from Nunapitchuk. Three other villages formerly served from neighboring plants now have their own generation. Information as to the exact sizes of these plants is not presently available to us. However, the figures shown on the tabulation for Mountain Village, Stebbins and Tooksook Bay are reasonably close estimates.

	Village	No. & kW of Plant Units	Installed Capacity kW
1.	Alakanuk	1-100; 1-75	175
2.	Angoon	1-175; 1-100; 1-75	350
3.	Anvik	2-50	100
4.	Chevak	1-150; 1-100; 1-50	300
5.	Eek	2-50	100
6.	Elim	2-50	100
7.	Emmonak	1-175; 1-100	275
8.	Gambell	2-75	150
9.	Goodnews Bay	2-75	150
10.	Grayling	1-50; 1-35	85
11.	Holy Cross	2-75	150
12.	Hooper Bay	1-150; 1-125; 1-75	350
13.	Huslia	1-50; 2-35	120
14.	Kasigluk	Served from Nunapitchuk	0
15.	Kalskag	Served from Lower Kalskag	0
16.	Kiana	1-100; 1-75; 1-35	210
17.	Kivalina	2-50	100
18.	Koyuk	2-75	150
19.	Lower Kalskag	1-100; 1-75; 1-50	225
20.	Marshall	2-50	100
21.	Mekoryuk	2-100	200
22.	Mountain Village	2-75 (Est.)	150
23.	New Minto	1-75; 2-50	175
24.	Noatak	2-75	150
25.	Noorvik	1-100; 1-75; 1-35	210
26.	Nulato	1-50; 1-40	90
27.	Nunapitchuk	1-150; 1-100; 1-75	325
28.	Old Harbor	2-75	150
29.	Pilot Station	1-75; 1-35	110
30.	Point Hope	1-100; 1-75; 1-35	210
31.	Quinhagak	2-75	150
32.	St. Mary's	1-300; 1-200	500
33.	St. Michael	1-150; 1-50	200
34.	Savoonga	2-100	200
35.	Scammon Bay	2-50	100
36.	Selawik	1-100; 1-75; 1-35	210
37.	Shageluk	2-75	150
38.	Shaktoolik	2-50	100
39.	Shishmaref	1-75; 1-35	110
40.	Shungnak	2-50	100
41.	Stebbins	2-100 (Est.)	200
42.	Tanunak	1-100; 1-50	150
43.	Togiak	1-75; 1-50; 1-35	160
44.	Tooksook Bay	2-75 (Est.)	150

The 1972 Construction Plans call for the addition of three more village electric systems as follows:

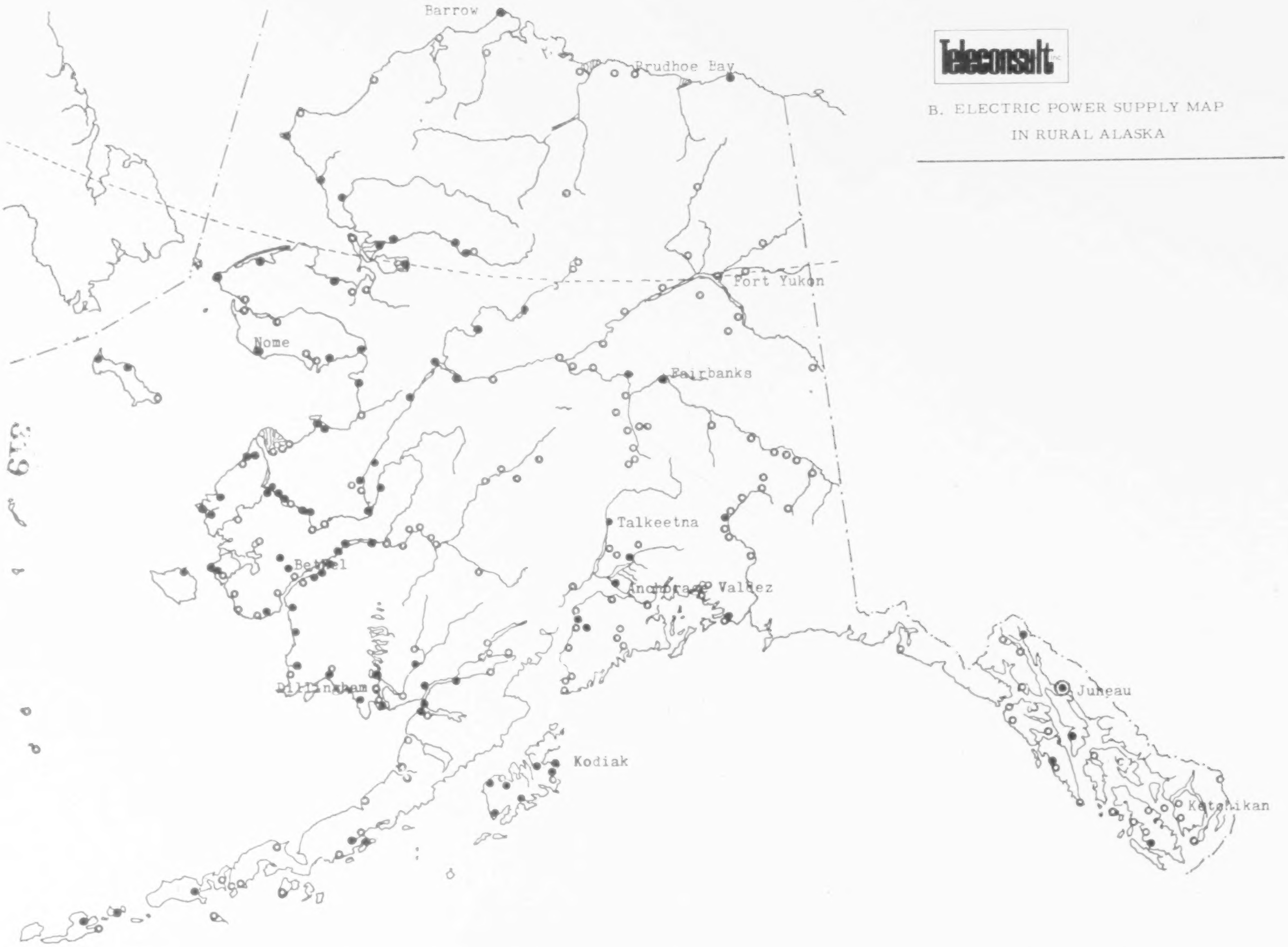
1. Kaltag: (2-150; 1-75 kW) 375 kW total installed capacity.

2. New Stuyahok: (2-125; 1-75 kW) 325 kW total installed capacity.

3. Wales: (2-100; 1-50) 250 kW total installed capacity.

Teleconsult inc

B. ELECTRIC POWER SUPPLY MAP IN RURAL ALASKA


Barrow
Prudhoe Bay
Fort Yukon
Nome
Fairbanks
Talkeetna
Bethel
Anchorage
Valdez
Dillingham
Juneau
Kodiak
Ketchikan

ANNEX D-5

INVENTORY TABLES ON ALASKA RURAL SCHOOLS

Column

3 Population figures are from the 1970 Census.

4 Native population figures are from the 1970 Census.

5 Percentage ratio of native to total.

6 Availability of electric power besides the one generated at the schools. Wherever figures are given they indicate KW power installed.

7 Power distribution facilities to houses.

8 Number of houses constituting the community.

9 School classification: State Operated Schools (SOS), Bureau of Indian Affairs (BIA), District Schools, Village Schools.

10 Schools total enrollment per community.

11 Region to which the community belongs according to the Alaska Native Associations; adjusted in accordance with the 1970 Census.

12 Permafrost existence in the community to be taken into account for future development.

13 Airport facilities: The code meanings for the airstrips are as follows:

D	dirt or turf runway
G	gravel runway
H	hard surface runway
S	seaplane landing available

The runway designation is followed by a number indicating the length in hundreds of feet and this is followed by the letter "L" if the strip is lighted. For example, H50L means a lighted hard-surfaced runway 5000 feet long. If airport has fuel available this is shown by "F". Scheduled airline service is shown by "AC" followed by a number indicating the number of days per week. "J" indicates jet fuel is available. If "I" is shown it means the field has navigation facilities and is equipped for instrument landing.

14 Distance: straight line distance from community to district center.

15 Language: a indicates Northern Eskimo (Arctic Slope, Bering Strait, Northwest Alaska); b Coastal Indian (Southeastern, Juneau); c Interior Indian (Tanana, Copper River, Cook Inlet, Chugachi Native); d, South, Southwestern Eskimo and Aleutian.

16 Bush Telephone: Commercial facilities under development by RCA Alascom.

Numbers in parenthesis indicate:

(1) Bethel Base Station
(2) Cape Romanzof Remote
(3) Aniak Remote
(4) Cape Newenham
(8) Dillingham Base Station
(12) Tin City Remote
(14) Cape Pole Remote Station

ALASKA - RURAL SCHOOLS INVENTORY

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Communities	Pop.	Native	%	El. Pwr.	Distr.	Hous-ing	School	Enroll.	Region	Perma Frost	Airport	Dist. Miles	Lang.	Bush Tele.
1-Akhiok (Alitak)	115	113	99	yes	?	22	SOS	42	11	no	AC2, 550	90	d	
2-Akiachak	312	300	96	priv. gen.		60	BIA	73	4	yes	D19, AC	25	d	yes(1)
3-Akiak	171	169	99		?	26	BIA	37	4	yes	D22, AC	35	d	yes
4-Akolmuit	526	512	97	diesel	all	103	BIA	184	4	yes	D30, AC	20	d	
5-Akutan	101	90	90	yes	20	22	SOS	17	8	no	S100	270	d	
6-Alakanuk	265	247	93	175	no	49	BIA	105	4	yes	AC3, D15	160	d	
7-Aleknagik	128	97	76	yes	yes	30	SOS	47	7	disc.	G12, AC	10	d	Inst. (8)
8-Allakaket	174	168	97			37	SOS	47	5	yes	G30, AC3	175	a	
9-Ambler	169	159	94	5	15	33	SOS	44	3	yes	AC2, D17	130	a	
10-Anaktuvuk Pass	99	97	98			26	SOS	35	1	yes	G44, AC2	240	a	
11-Anderson Village	362	7	2			104	SOS	94	5	yes	Nenana	70		
12-Atka	88	86	98			22	SOS	27	8	no	no	400	d	
13-Angoon	400	377	94	350	all	90	SOS	138	10	no	S100, AC3	60	b	
14-Anvik	83	75	90	100	all	27	SOS	27	4	yes	D20, AC3	145	d	
15-Aniak	205	170	82	yes	yes	55	SOS	?	4	yes	G50L,AC3	105	d	yes(1)
16-Annette	195	22	11			55	SOS	150	10	no	H57L, AC	250	b	
17-Arctic Village	85	82	97			26	SOS	40	1	yes	AC3, G45	235	a	
18-Atmautluak								46	4					yes(1)
19-Beaver	101	86	86			35	BIA	32	5	yes	G37, AC1	110	c	
20-Belkofsky	59	53	92			22	SOS	17	8	no	S50, AC	390	b	
21-Bethel	2416	1871	77	yes	all	717	SOS	872	4	yes	H642, F	0	d	yes(1)
22-Brevig Mission	123	118	96			18	BIA	48	2	yes	D44, AC2	65	a	Inst (12)
23-Buckland	104	103	99			24	SOS	32	3	yes	G20, AC2	65	a	
24-Barrow	2104	1906	90	yes	289	395	BIA	665	1	yes	H65, F	0	a	

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Communities	Pop.	Native	%	El. Pwr.	Distr.	Hous-ing	School	Enroll.	Region	Perma Frost	Airport	Dist. Miles	Lang.	Bush Tele.
25-Bettles								12	5			180	a	
26-Birch Creek								10	5			110	c	
27-Campbell	48	6	15			15			10	no		210	b	
28-Cantwell	62	43	69			22	SOS	28	5	disc.	G21, F	105	c	
29-Cape Pole	123	15	12			26	SOS	31	10	no	S100, AC	150	b	Inst. (14)
30-Central	26	3	11			36			5	yes	G32, AC	110	c	
31-Chalkyitsik	130	123	95	?		31	SOS	23	5	yes	D25, AC3	165	c	
32-Chefornak	146	141	97	?	21	29	BIA	43	4	yes		80	d	
33-Chevak	387	376	97	300	?	66	BIA	141	4	yes		130	d	yes(2)
34-Chignik	83	67	81	yes	24	30	SOS	17	8	no	S100, AC	440	d	
35-Chignik Lagoon	70	65	93	?		10	SOS	17	8	disc.	G23, AC4	430	d	
36-Chignik Lake	117	115	99	priv. gen.		22	SOS	38	8	no	G23, AC	420	d	
37-Chistochina	33	17	51			15	SOS	18	12	no	G22, F	40	c	
38-Chitina	38	6	16			35			9	no	G36, AC1	75	c	
39-Chuathbaluk	94	90	95			18	SOS	34	4	yes		125	c	Inst. (3)
40-Circle	54	32	59			22	SOS	17	5	yes	G29, F	120	c	
41-Clark's Point	95	75	79	?	priv.	32	SOS	24	7	disc.	G17, AC	15	d	Inst. (8)
42-Cold Bay	256	32	13			75	SOS	23	8	no	H100L, F	320	d	
43-Cooper Landing	31	1	3			38	Dist.	18	9	no	G28	135	d	
44-Copper Center	206	93	45			74	SOS	33	12	no	D18, F	15	c	
45-Cordova	1169	190	16	yes	yes	426	Dist.	529	9	no	H75L, F	0	c	
46-Craig	272	153	56			92	Dist.	89	10	no	S100, F	200	b	
47-Crooked Creek	59	55	93			15	SOS	33	4	yes		140	c	
48-Canyon Village									5			210	c	
49-Candle									3			110	a	

1 2 Communities	3 Pop.	4 Native	5 %	6 El. Pwr.	7 Distr.	8 Hous-ing	9 School	10 Enroll.	11 Region	12 Perma Frost	13 Airport	14 Dist. Miles	15 Lang.	16 Bush Tele
50-Cape Lisbourne									1			280	a	
51-Chaniliut									4			160	d	
52-Cape Romanzof									4					yes(2)
53-Cape Newenham														yes(4)
54-Deadhorse	163	15	9	at school		1			1	yes	G50L, AC6	170	a	
55-Deering	85	83	98			19	SOS	39	3	yes	G23, AC2	65	a	
56-Delta Junction	703	10	1	?	230	261	SOS	430	5	yes	H75L, F	80	c	
57-Dillingham	914	587	64	yes	yes	267	Dist.	344	7	disc.	G50L, F	0	d	yes(2)
58-Diomede	84	82	98			26	BIA	28	2	yes	no	135	a	Inst (12)
59-Dot Lake	42	29	69			16	SOS	12	12	yes	D11	130	c	
60-Eagle	36	4	11			26	SOS	17	5	yes	G36, AC2	190	c	
61-Edna Bay	112	3	3			20			10	no	S80, AC	160	b	
62-Eek	186	167	90	100	11	40	BIA	56	4	yes	S50, AC2	35	d	Inst (1)
63-Egegik	148	74	50			57	SOS	44	7	disc.	G19, AC	75	d	Inst (6)
64-Eklutna	25	23	92	?	4	13			6	no	no	20	c	
65-Ekuk	51	50	98	ind. gen.	no	43	SOS	15	7	disc.	D10, AC5	25	d	Inst (8)
66-Ekwok	103	94	91			26	SOS	26	7	disc.	G22, AC5	40	d	
67-Elfin Cove	49	2	2			28			10	no	S100. AC	70	b	
68-Elim	174	168	97	100	all	42	BIA	47	2	yes	D18, AC3	90	a	
69-Emmonak(Kwiguk)	439	421	96	275	all	96	BIA	134	4	yes	D20L	160	d	
70-English Bay	58	53	91	?	2	16	Dist.	547	6	no	G20	150	d	
71-Evansville	57	14	25	ind. gen.		20			5	yes	G50L, F	175	a	
72-False Pass	62	58	94		?	16	SOS	20	8	no	G26, AC1	305	d	
73-Fort Yukon	448	376	84			107	SOS	187	5	yes	G50, F	140	c	
74-Gakona	88	23	26			27	SOS	38	12	no	G37, F	20	c	

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Communities	Pop.	Native	%	El. Pwr.	Distr.	Housing	School	Enroll.	Region	Perma Frost	Airport	Dist. Miles	Lang.	Bush Tele.
75-Galena	302	265	88	priv. gen.	all	66	SOS	99	5	yes	H44L, F	270	c	
76-Gambell	372	356	96	150	11	70	BIA	91	2	yes	H45, AC2	195	a	
77-Glenallen	363	37	11			109	SOS	256	12	no	D20	0	c	
78-Golovin	117	111	95			24	SOS	32	2	yes	G24, AC3	90	a	
79-Goodnews Bay	218	210	96	150	all	41	BIA	59	4	yes	G16, AC2	100	d	yes(4)
80-Grayling	139	136	98	85	all	28	BIA	46	4	yes	G25, F	175	d	
81-Gulkana	53	52	98	REA	16	27	Gakona School		12	no	H52L, F	10	c	
82-Gustavus	64	4	6			27	SOS	10	10	no	H75L	50	b	
83-Georgetown	12	0	0						4			165	c	
84-Haines	463	110	24			143	Dist.	462	10	no	G46, F	75	b	
85-Healy	79	10	12			30	SOS	124	5	yes	G26, AC	70	c	
86-Holy Cross	199	192	97	150	all	50	SOS	52	4	yes	G22, F	125	d	
87-Homer	1083	58	5			368	Dist.	277	6	no	H50L, F	120	d	yes(10)
88-Hoonah	748	539	72	?	115	175	Dist.	292	10	no	G28, F	45	b	
89-Hooper Bay	490	477	97	350	all	74	BIA	226	4	yes	H40, AC3	145	d	yes(2)
90-Hope	51	0	0			45	Dist.	11	6	no	G17	20	c	
91-Houston	69	2	3			48	Dist.		6	no		25	c	
92-Hughes	85	73	86	priv.	all	16	SOS	23	5	yes	G46, F	200	a	
93-Huslia	159	151	95	120	all	30	SOS	49	5	yes	D30, AC3	250	a	
94-Hydaburg	214	189	88	AP&T	all	63	Dist.	50	10	no	S50, AC7	220	b	
95-Hyder	49	0	0			21			10	no	S100, AC7	225	b	
96-Hot Springs													c	
97-Hamilton													d	
98-Halibut Cove														Inst. (10)
99-Igiugig	36	34	95	school	2	12	SOS	18	7	disc.	D27	95	d	Inst. (6)

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Communities	Pop.	Native	%	El. Pwr.	Distr.	Housing	School	Enroll.	Region	Perma Frost	Airport	Dist. Miles	Lang.	Bush Tele.
100-Iliamna	58	23	41			24	see Newhalen		7	disc.	G50L, AC	140	d	Inst. (7)
101-Ivanof Bay	48	46	96	?	8	11	SOS	16	8	no	S100, AC	410	d	
102-Kachemak	76	12	16			19			6	no	Homer	120	c	
103-Kake	448	406	91			105	Dist.	183	10	no	S100, F	95	b	
104-Kokhanok	88	67	76	?	1	19	SOS	25	7	disc.	G12	145	d	Inst. (7)
105-Kaktovik	123	108	88	yes	25	32	BIA	41	1	yes	AC2, F	210	d	
106-Kalskag	122	106	87	tie-line	all	32	BIA	40	4	yes	G22, AC3	75	a	Inst.
107-Kaltag	206	193	94	315?	75%	47	SOS	75	4	yes	G22, AC2	330	a	
108-Karluk	98	95	97	ind. gen.		32	Dist.	20	11	no	D14, S30	75	d	
109-Kasaan	30	8	27			10			10	no	S20, AC1	200	b	
110-Kasilof	71	0	0			20			6	no	C28	65	c	
111-Kenai	3533	175	5	yes	yes	1182	Dist.	1817	6	no	H75L, F	60	c	
112-Kiana	278	268	97	210	all	72	BIA	80	4	yes	G40, F	55	a	
113-King Cove	283	252	89	?	90%	61	Dist.	69	8	no	G40	330	d	
114-King Salmon	202	12	6			78	Dist.	26	7	disc.	H85L, F	70	d	yes(5)
115-Kipnuk	325	320	98	?	45	52	BIA	111	4	yes	S30, AC2	85	d	
116-Kivalina	188	183	97	100	all	33	SOS	52	3	yes	D20, AC2	80	a	
117-Klawock	213	195	92			58	Dist.	72	10		S50, AC7	190	b	
118-Klukwan	103	92	89			35	BIA	20	10	no		90	b	
119-Kodiak	3798	642	17	yes	all	1218	Dist.	1107	11	no	H75L, F	0	d	yes(8)
120-Koliganek	142	134	94	?	8	20	SOS	40	7	no	G22, AC5	60	d	
121-Kongiganek	190	183	96	priv. gen.	23	32	SOS	61	4	yes	G20, AC2	60	d	
122-Kotlik	228	224	98	?	9	43	BIA	64	4	yes	D20, AC3	165	d	
123-Kotzebue	1696	1338	79	?	247	420	BIA	638	3	yes	H60L, F	0	a	
124-Koyuk	122	121	100	150	all	25	SOS	44	2	yes	G20, AC2	130	a	
125-Koyukuk	124	121	98			22	SOS	48	5	yes	D18, AC1	295	a	

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Communities	Pop.	Native	%	El. Pwr.	Distr.	Hous-ing	School	Enroll.	Region	Perma Frost	Airport	Dist. Miles	Lang.	Bush Tele.
126-Kwethluk	408	390	96	75	all	81	BIA	112	4	yes	G18, AC2	25	d	yes(1)
127-Kwigillingok	148	145	98			24	BIA	56	4	yes	S20, AC2	65	d	
128-Kasigluk				served					4			30	d	yes(1)
129-Kiana				210					3			55	a	
130-Kobuk									3			155	a	
131-Larsen Bay	109	91	82	ind. gen.		31	Village	32	11	no	S100, AC3	60	d	
132-Levelock	74	60	81	ind. gen.	9	17	SOS	24	7	disc.	D16, AC2	55	d	Inst. (5)
133-Lime Village	25	25	100			4			4	yes		230	c	
134-Lower Kalskag	183	177	97	225	all	45	BIA	47	4	yes	Kalskag	60	d	Inst. (3)
135-Manley Hot Springs	34	11	33			27	SOS	9	5	no	G28, F	85	c	
136-Manokotak	214	205	96	yes		37	SOS	71	7	disc.	G26	30	d	
137-Marshall	175	169	97	100	all	37	SOS	38	4	yes	D13, F	80	d	
138-McGrath	279	116	39			68	SOS	134	5	yes	H52L, F	270	c	
139-Mekoryuk	249	234	94	200	all	57	BIA	80	4	yes	G36, AC2	140	d	
140-Mentasta Lake	68	64	94			17	SOS	20	12	no		80	c	
141-Metlakatla	1050	860	81	?		230	SOS	356	10	yes	Annette	250	b	
142-Minto	168	159	95	yes	all	39	SOS	?	5	yes	no	45	c	
143-Montana	33	4	12			23			5	no		90	c	
144-Moose Pass	53	0	0			23	Dist.	28	6	no	S50	55	c	
145-Mountain Village	419	394	94	150	all	78	BIA	124	4	yes	G21, AC3	110	d	
146-Mt. Edgecumbe	835	483	58	?		279	Dist.	139	10	no		100	b	
147-Myers Chuck	37	2	5			15			10	no	S70	200	b	
148-Medfra									4			290	c	
149-Minchumina Lake									4			380	c	
150-Makok									4			135	d	

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Communities	Pop.	Native	%	El. Pwr.	Distr.	Housing	School	Enroll.	Region	Perma Frost	Airport	Dist. Miles	Lang.	Bush Tele.
151-Mumtrak									4			110	d	
152-Naknek	178	38	21	yes	all	48	Dist.	211	7	disc.	KingSal	60	d	
153-Napakiak	270	265	98			43	BIA	69	4	yes	S100, AC4	10	d	yes(1)
154-Napaskiak	259	255	98			49	BIA	59	4	yes	S150, AC2	10	d	yes(1)
155-Nelson Lagoon	43	39	91			16	SOS	13	8	no	Pt. Moller	350	d	
156-Nenana	362	142	39			128	Dist.	235	5	yes	G63L, F	50	c	
157-Newhalen	88	83	94		3	14	SOS	44	7	disc.	Iliama	130	d	Inst. (6)
158-New Stuyahok	216	208	96	325	50%	32	SOS	68	7	disc.	G22, AC5	50	d	
159-Newtok	114	111	97			19	BIA	45	4	yes	S50, AC1	90	d	
160-Nightmuit	127	122	96			22	BIA	35	4	yes	S40, AC2	100	d	
161-Nikolai	112	101	90			26	SOS	31	4	yes	McGrath	290	c	Inst. (10)
162-Nikolski	57	52	91		10	27	SOS	11	8	no	G35L, AC2	300	d	
163-Ninilchik	134	18	13			62	Dist.	117	6	no	G25	100	c	
164-Noatak	293	286	98	150		57	SOS	62	3	yes	G24, AC	55	a	
165-Nome	2488	1534	62	yes	all	833	Dist.	826	2	yes	H60L, F	0	a	
166-Nondalton	184	182	99		3	51	SOS	73	7	disc.	G23	140	c	Inst. (6)
167-Noorvik	462	443	97	210	all	76	SOS		3	yes	G18, AC3	35	a	
168-North Pole	265	35	13						5	disc.		20	c	
169-Northway	40	10	25		7	16	SOS	83	5	yes	H70L, F	195	c	
170-Nulato	308	298	97	90	all	51	SOS	126	5	yes	G24, F	205	a	
171-New Minto				175					5			45	c	
172-Nunapitchuk				325					4			30	d	yes(1)
173-Nabesna Village									5			220	c	
174-Nooiksut									1			140	a	
175-Old Harbor	290	269	93	150	all	54	Village	88	11	no	G20, AC6	55	d	
176-Oscarville	41	38	92			11	BIA	11	4	yes	Bethel	10	d	yes(1)

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Communities	Pop.	Native	%	El. Pwr.	Distr.	Housing	School	Enroll.	Region	Perma Frost	Airport	Dist. Miles	Lang.	Bush Tele.
177-Ouzinkie	160	143	89	yes	all	55	Village	34	11	no	S100, AC	10	d	Inst. (8)
178-Nunpitsunchak														yes
179-Point Baker														Inst. (12)
180-Palmer	1140	38	3	yes	all	379	Dist.	1384	6	no	H40L, F	40	c	
181-Paulof Harbor	39	38	97			14			8	no	S30, AC	340	d	
182-Pedro Bay	65	51	78			22	SOS	18	7	no	D16	165	c	Inst. (6)
183-Pelican	133	27	20			59	Dist.	33	10	no	S100, F	75	b	yes
184-Perryville	94	90	96			27	SOS	14	8	no	AC4, D18	430	d	
185-Petersburg	2042	295	15			706	Dist.	686	10	no	G50, F	120	b	
186-Pilot Point	63	58	85		11	24	SOS	10	7	disc.	G55, AC5	105	d	
187-Pilot Station	290	287	99	110	all	48	BIA	77	4	yes	D23, AC3	90	d	
188-Pitka's Point	70	67	96	yes		15	SOS	17	4	yes	boat	100	d	
189-Platinum	55	48	87			18	SOS	30	4	yes	G40L, F	125	d	yes(9)
190-Point Hope	386	369	97	210	all	69	SOS	93	1	yes	G41L, F	310	a	
191-Port Alexander	36	3	9			16			10	no	S30, AC	140	b	Inst. (13)
192-Port Chilkoot	220	52	24			62	see Haines		10	no		75	b	
193-Port Graham	107	96	90		4	30	Dist.	26	6	no	G18	145	d	
194-Port Heiden	66	58	88			13	SOS	23	7	disc.	G75L, F	140	d	
195-Port Lions	227	184	81	yes	61	67	Village	58	11	no	G26, AC6	20	a	
196-Prudhoe Bay	49	4	8			0			1		Deadhorse	200	a	
197-Point Lay									1			180	a	
198-Paradise									4			120	d	
199-Portage Creek									7			30	d	Inst. (7)
200-Quinhagak	340	332	98	150	all	72	BIA	83	4	yes	G20, AC	70	d	
201-Rampart	36	21	58			16	SOS	13	5	yes	G25, F	80	c	

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Communities	Pop.	Native	%	El. Pwr.	Distr.	Housing	School	Enroll.	Region	Perma Frost	Airport	Dist. Miles	Lang.	Bush Tele.
202-Red Devil	81	22	27		2	18	SOS	23	4	yes	G40, AC3	160	c	
203-Ruby	145	134	92			46	SOS	42	5	yes	G26, AC2	225	c	
204-Russian Mission	146	138	95			33	SOS	28	4	yes	G15, AC2	70	d	
205-St. George Is.	163	156	94			32	SOS	54	8	no	G23	45	d	
206-St. Mary's	384	350	91	500	all	46	SOS	116	4	yes		105	d	
207-St. Michael	207	192	92	200	all	44	BIA	61	2	yes	D20, F	125	d	
208-St. Paul Is.	450	428	95			97	SOS	117	8	no	G52L, F	0	d	
209-Sand Point	360	265	74			94	SOS	93	8	no	G38, F	395	d	
210-Suvoonga	364	354	97	200	all	54	BIA	102	2	yes	G40, AC2	160	a	
211-Saxman	135	99	73			29	inc. Gateway		10	no	Ketchika	225	b	
212-Scammon Bay	166	166	100	100	all	29	BIA	52	4	yes		140	d	yes(2)
213-Selawik	429	418	98	210	all	89	SOS	131	3	yes	D16, AC3	70	a	
214-Seldovia	437	138	32			156	Dist.	188	6	no	G21, F	130	c	
215-Seward	1587	216	14			591	Dist.	609	9	no	G48L, F	140	d	
216-Shageluk	167	158	95	150	all	51	BIA	35	4	yes	D22, AC3	140	d	
217-Shaktoolik	151	144	95	100	all	24	BIA	37	2	yes	G29, AC2	130	a	Inst. (2)
218-Sheldon's Point	125	121	97			20	BIA	51	4	yes	S150, F	155	d	
219-Shishmared	267	249	93	110	all	58	SOS	71	2	yes	G22, F	120	a	
220-Shungnak	165	160	97	100	all	31	SOS	49	3	yes	G14, AC2	145	a	
221-Sitka	3370	836	25	yes	all	976	Dist.	1674	10	no	H50L, F	95	b	
222-Skagway	675	41	6	yes	all	250	Dist.	205	10	no	H33, F	80	b	
223-Sleetmute	109	95	87			29	SOS	18	4	yes	G20, AC3	165	c	
224-Soldotna	1202	16	1	tie-line	all	397	Dist.	392	6	no	H50L, F	65	c	
225-South Naknek	154	85	60		32	36	Dist.	48	7	disc.	G25, AC	60	d	Inst. (5)

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Communities	Pop.	Native	%	El. Pwr.	Distr.	Housing	School	Enroll.	Region	Perma Frost	Airport	Dist. Miles	Lang.	Bush Tele.
226-Squaw Harbor	65	52	80			15			8	no	S50, AC	385	d	
227-Stebbins	231	223	97	200	all	43	BIA	61	2	yes	D20, AC3	120	a	
228-Stevens Village	74	72	97			26	SOS	15	5	yes	D22, AC3	90	c	
229-Stony River	74	61	82			18	SOS		4	yes	G20, AC3	180	c	
230-Summit	34	2	6			12			5	no	G50L, F	120	c	
231-Suntrana	67	11	16			21	see Healy		5	yes	D20	60	c	
232-Sutton	76	3	4			26	none		6	no	G15	55	c	
233-Tin City														yes(11) Inst. (10)
234-Takotna														
235-Talkeetna	182	12	6			86	Dist.	135	6	no	G40L, F	75	c	
236-Tanacross	84	77	92			25	SOS		5	yes	H50	165	c	
237-Tanana	120	9	7			46	SOS	171	5	yes	G44L, F	130	c	
238-Tatitlek	111	107	96			33	SOS	25	9	no	S80	35	d	
239-Teller	220	192	87		34	66	SOS	56	2	yes	G10, AC3	55	a	
240-Tenakee Spring	86	10	12			85			10	no	S70, AC	60	b	
241-Tetlin	114	108	95			32	BIA	25	5	yes	D20, AC	195	c	
242-Thorne Bay	443	7	2			109	SOS	105	10	no	S30, AC7	190	b	
243-Togiak	383	377	98	160		67	SOS	133	7	disc.	G30, AC5	65	d	
244-Tok	214	26	12			76	SOS	221	5	yes	G32	180	c	
245-Toksook Bay	257	251	97	150	all	47	BIA	68	4	yes	G20, AC2	110	d	
246-Tuluksak	195	193	99	priv. gen.	25	37	BIA	49	4	yes	D25, AC2	30	d	yes(1) Inst. (1)
247-Tuntutuliak	158	154	97			36	BIA	45	4	yes	S20, AC2	45	d	
248-Tununak	274	270	99	150	all	57	BIA	8	4	yes	G24, AC1	120	d	
249-Twin Hills	67	66	98		13	15	SOS	25	7	disc.	Togiak	60	d	
250-Tyonek	232	221	95			68	Village	72	6	no	G34L, AC	50	c	
251-Telida									4			320	c	

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Communities	Pop.	Native	%	El. Pwr.	Distr.	Hous-ing	School	Enroll.	Region	Perma Frost	Airport	Dist. Miles	Lang.	Bush Tele.
252-Tatalina													c	yes(10)
253-Unalakleet	434	403	92			120	BIA	158	2	yes	G60L, F	150	a	
254-Unalaska	178	121	69	yes	all	72	Dist.	108	8	no	G43, F	260	d	
255-Usibelli	102	14	14			23			5	yes	D20	50	c	
256-Valdez	1005	150	15	?	all	299	Dist.	327	9	no	G45, F1	45	c	
257-Venetie	112	108	96			28	BIA	25	5	yes	D44, AC3	155	c	
258-Wainwright	315	307	97		all	55	BIA	105	1	yes	G22, AC2	85	a	
259-Wales	131	121	92	250		36	SOS	36	2	yes	M15, AC3	105	a	
260-Wasilla	300	3	1		all	114	Dist.	490	6	no	G23	35	c	
261-White Mountain	87	84	96		1	22	SOS	24	2	yes		60	a	
262-Whittier	130	5	4		all	136	SOS	15	9	no	rail.	100	d	
263-Wrangell	2029	421	21			667	Dist.	645	10	no	G50, AC2	150	b	
264-Yakutat	190	157	82		47	63	Dist.	103	10	no	H78L, F	205	b	

ANNEX E

ANNEX E-1	PROJECT ACTIVITIES
ANNEX E-2	INDIVIDUALS AND ORGANIZATIONS CONTACTED DURING THE STUDY

ANNEX E-1

PROJECT ACTIVITIES

It is believed that instructional technology combined with required telecommunications capabilities can provide tools of great potential in offering needed services to Alaska, a state with such a unique combination of topographical, economic and social conditions. To this end, the U.S. Office of Education, Department of Health, Education and Welfare, and the Office of Space Science and Applications, National Aeronautics and Space Administration, have jointly sponsored a two-phase study of the educational needs in rural Alaska, and the potentials of educational technology and information networks to meet these needs.

The first phase study contract was awarded to the Alaska Educational Broadcasting Commission, Alaska State Department of Education. The Commission assigned the task to the Educational Telecommunications Consortium, a committee established by the Commission to provide policy guidance for educational broadcasting. The Consortium is composed of representatives of many agencies involved in the rural educational and native organizations in Alaska. The Consortium, in turn subcontracted to Teleconsult, Inc. for the First Phase effort.

In approaching this work, Teleconsult, Inc. assembled a team of multi-disciplinary professionals in educational planning, instructional technology, economics, telecommunications systems engineering. Our research and exploration were largely built on studies and data already available, and centered on compilation, evaluation and synthesis of all relevant materials with supplemental first-hand investigation based on visits to rural Alaska.

The overall effort was divided into four tasks leading from the descriptions of needs to the prescription of services, to the exploration of the technical implications of such services, to the concluding observations and recommendations.

TASK A - Survey of Economic Conditions Affecting Educational Requirement and Financial Sources

This task was built largely on data available from numerous sources and was carried out by Professor Arlon Tussing. This work was greatly facilitated by recent research conducted at the Institute of Social, Economic and Government Research, University of Alaska due to the recent discovery of oil and gas reserves in the North Slope and enactment of the Alaska Native Claims Settlement Act of 1971.

TASK B - Survey of Educational Requirements at all Levels and in all Regions

This effort was carried ou by Professor Charles Ray and Mrs. Doris Ray. The research work was facilitated by the data base and research programs at the Center for Northern Education, the University of Alaska, with substantial participation of the natives.

TASK C - Instructional Technology Options

This work was performed by Professor Gabriel Ofiesh with the assistance of Mrs. Charmain Norman. The team has access to the resources of the Center for Instructional Technology, American University.

TASK D - Survey of Existing Telecommunications Facilities and Electric Power Supply and Plans for Rural Communities

This task was performed by Dr. Juan P. Arnaud in the electric power and telecommunications terrestrial facilities, and Mr. Julius Leonhard in the area of satellite communications.

The overall project organization is depicted in Exhibit E-1. Work was commenced in early January 1972. A two-day planning session was held on January 27 and 28 to seek guidance and advice from various organizations, agencies and private individuals who had had extensive experience in educational and telecommunications technologies in Alaska. The Agenda of this planning session is shown in Exhibit E-2. A progress report was submitted in March, 1972 and approval was received from the Alaska Educational Broadcasting Commission, Educational Telecommunications Consortium, the Office of Education and National Aeronautics and Space Administration. In early April, a field team consisting of Dr. Ling, Dr. Wigren, Dr. Arnaud and Mr. Leonhard, spent one week in consultation with various organizations in Alaska, together with visits to rural schools in the Barrow and Dillinham areas. A list of the individuals and organizations contacted is given in Exhibit E-2.

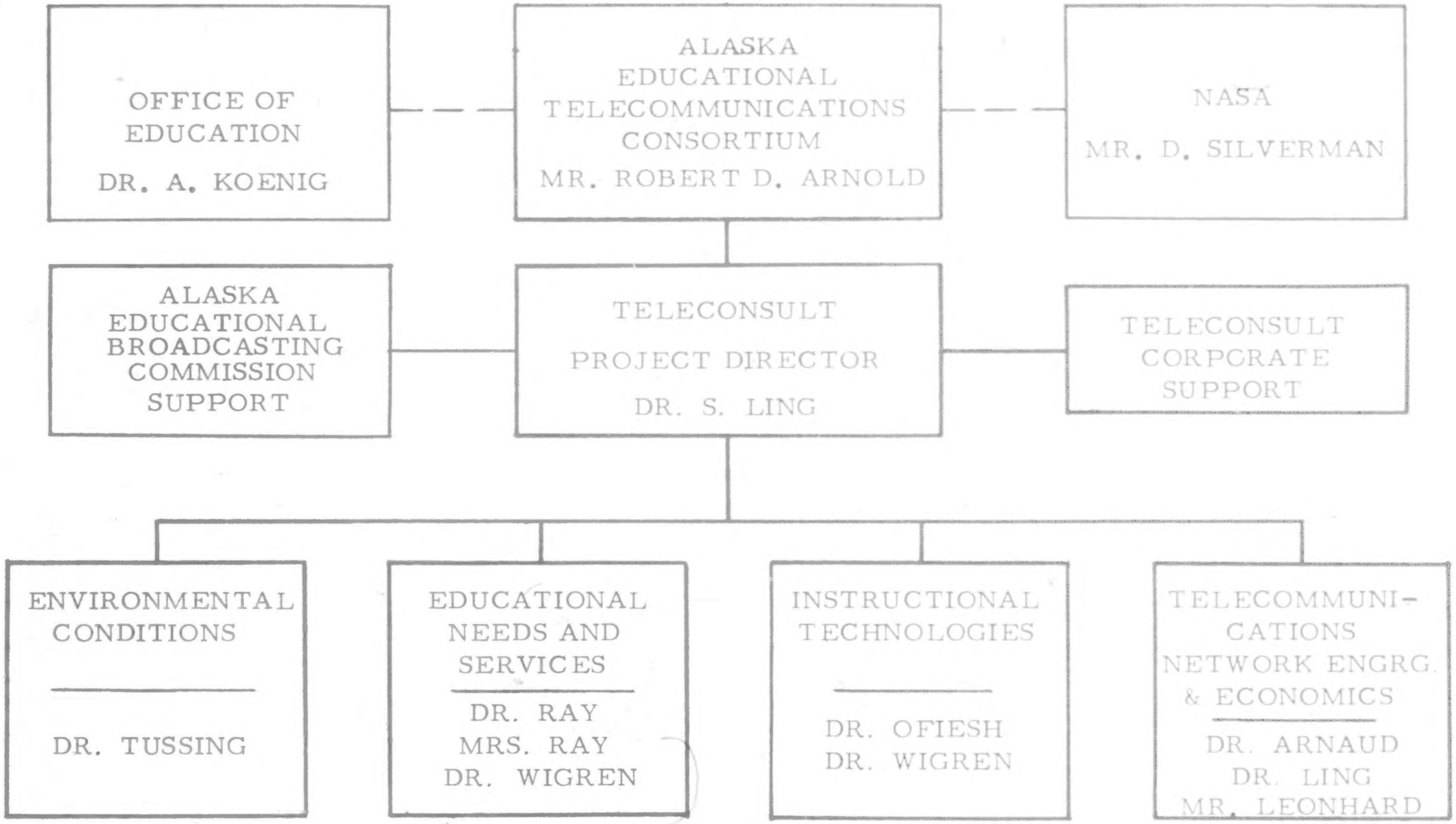

OFFICE OF EDUCATION
DR. A. KOENIG
ALASKA EDUCATIONAL TELECOMMUNICATIONS CONSORTIUM
MR. ROBERT D. ARNOLD
NASA
MR. D. SILVERMAN
ALASKA EDUCATIONAL BROADCASTING COMMISSION SUPPORT
TELECONSULT
PROJECT DIRECTOR
DR. S. LING
TELECONSULT CORPCRATE SUPPORT
ENVIRONMENTAL CONDITIONS
DR. TUSSING
EDUCATIONAL NEEDS AND SERVICES
DR. RAY
MRS. RAY
DR. WIGREN
INSTRUCTIONAL TECHNOLOGIES
DR. OFIESH
DR. WIGREN
TELECOMMUNICATIONS NETWORK ENGRG. & ECONOMICS
DR. ARNAUD
DR. LING
MR. LEONHARD

EXHIBIT E-1 - PROJECT ORGANIZATION

EXHIBIT E-2

A STUDY OF THE POTENTIAL OF TELECOMMUNICATIONS AND EDUCATIONAL TECHNOLOGY TO SATISFY THE EDUCATIONAL COMMUNICATIONS NEEDS OF THE STATE OF ALASKA

AGENDA FOR PLANNING SEMINAR

January 27 and 28 of 1972

National Education Association
Washington, D.C.

A. Orientation

Background, objectives of the study, time frame, tasks to be accomplished

Dr. Suilin Ling, Director and
Chief Economist, Teleconsult, Inc.

B. Expectations of the U.S. OE/NASA for this Project

Mr. Donald Silverman, NASA

Dr. Adolph Koenig, USOE

C. Economic, Political and Legal Environment

Mr. Max Gruenberg
Legislative Assistant to
U.S. Sen. Stevens

Mr. Douglas Jones, Legislative Asst.
to U.S. Sen. Gravel, Former Chief
Economist, Federal Field Comm. of
Alaska

Mr. Guy Martin, Administrative
Asst. to Congressman Begich.
Former Professor of Political
Science at the Alaska Methodist
University

Prof. Arlon Tussing, Associate
Professor of Economics, Univ. of
Alaska. Staff Economist, U.S. Senate
Comm. on Interior and Insular Affairs

D. Educational Environment

Dr. Charles K. Ray, Professor
of Education, Univ. of Alaska

Mr. Showalter J. Smith
H. E. W. Fellow

E. Briefing by NASA/HEW/CPB on Satellite Experiments and Applications on ATS Series

Dr. Albert Horley, Director of
Telecommunication Planning and
Evaluation/HEW

Mr. Donald Silverman/NASA

Mr. Philip Rubin, Director of
Engineering Research and
Development/CPB

Mr. Kenneth R. Clark
Director, Special Projects, CPB

F. Report on UNESCO Study Team (Cassirer/Wigren) To Alaska

Dr. Harold Wigren, Division of Instruction and Professional
Development, NEA

G. Report on NAEB Exploratory Study in Alaska

Mr. George Hall
National Association of
Educational Broadcasters

Mr. Frank Norwood, Executive
Director, Joint Council on
Educational Telecommunications, Inc.

H. Report on Related Projects Undertaken by the Arctic Institute of North America

Mrs. Rose Barquist, AINA

Mr. J. A. Hatchwell, AINA

ANNEX E-2

NAMES AND LOCATIONS OF ORGANIZATIONS AND INDIVIDUALS CONTACTED AND/OR VISITED DURING THE STUDY

ANCHORAGE

Alaska Educational Broadcasting Commission members

Arnold, Robert, Director of Alaska Educational Broadcasting Commission

Carter, Harry, Executive Director, Alaska Federation of Natives

Chiei, Fred D., Jr., Executive Vice President, RCA Alaska Communications

Custrini, Louis A., Manager, Public Affairs, RCA Alaska Communications

Heibert, Augie, President, Northern Television, Inc. and member of Broadcast Commission

Holthaus, Gray, Director, Bilingual Education Program State Operated Schools staff

Larsen, Jeanmarie, Acting Statewide Coordinator, Education Committee, Alaska Federation of Natives

McCaughn, William, Audio-Visual Coordinator, Anchorage Borough School District

Motz, Larry, Director, PERCY (Media Center), State Operated School System

Murphy, D. M., Alaska Planning and Evaluation Center and State Operated Schools staff

Nelson, Elaine, Statistical and PL 874 Attendance Coordinator, State Operated Schools System

Salisbury, Lee H., Member of Alaska Educational Broadcasting Corporation and Director of COPAN Project, University of Alaska

Sellers, John, Chief Engineer, RCA Alaska Communications

State Operated Schools Staff

FAIRBANKS

Carey, Mary, Nursing Supervisor, Alaska Department of Health

Fahrenkamp, Bettye, Director, Curriculum Service Center, Fairbanks North Star Borough School District

Finger, James R., General Supply Assistant, Fairbanks Agency Office, Bureau of Indian Affairs

Frith, Paul, Health Officer, Northern Region, Alaska Department of Health

Long, William O., Education Program Administrator, Fairbanks Agency Office, Bureau of Indian Affairs

Magnuson, Betty, Home-School Coordinator, Division of Regional Schools and Boarding Home Program, Alaska Department of Education

Merritt, Robert, Professor of Geophysics, University of Alaska

Northrip, Charles, Director and General Manager, Division of Media Services KUAC-FM-TV, University of Alaska

Olmscheid, Donald, Deputy Executive Secretary, NEAA-Alaska Superintendent

Reed, E. Irene, Director, Eskimo Language Workshop, University of Alaska

Stanley, Glenn, Professor of Geophysics, University of Alaska

University of Alaska, Radio-TV facility staff

BARROW

BIA School Staff and Community Leaders

Denneen, Larry, Executive Secretary, North Slope Native Association

Fauske, Dave, Ninth grade teacher, Barrow School

George, Clarence, Kindergarten teacher, Barrow Elementary School

Gullickson, Dan R., Director of Educational Media, BIA Regional School Office

Hughes, James E., Principal, Barrow Day School, Bureau of Indian Affairs

Igtanloc, Irving J., President, Northern Development Enterprises, Ltd.

Upicksoun, Joseph, President, North Slope Native Association

JUNEAU

Cooksey, Robert C., Deputy Executive Secretary, Alaska-NEA

Harper, James M., Director, Division of Regional Schools and Boarding Home Program, Alaska Department of Education

Lind, Marshall, Commissioner of Education, State of Alaska

Miller, Mrs. Romaka C., Ketchikan

Potter, William H., President, NEA-Alaska

Van Houte, Robert, Executive Secretary, NEA-Alaska

DILLINGHAM AREA

Biship, James, Koliganek School

Chaney, Van O., Manokotak School

Cherry, Robert, District Principal

Daley, E. Kevin, Ohgsenakale School

Klemm, Ron, SOS Principal

Riedel, Francis, Ekwok School

Turner, Dan, SOS Superintendent

WASHINGTON, D. C.

Barquist, Mrs. Rose, Arctic Institute of North America

Clark, Kenneth R., Director, Special Projects, Corporation for Public Broadcasting

Gruenberg, Max, Legislative Assistant to U. S. Senator Stevens

Hall, George, Research and Development, National Association of Educational Broadcasters

Hatchwell, J. A., Arctic Institute of North America

Horley, Dr. Albert, Director of Telecommunication Planning and Evaluation, U. S. Department of Health, Education and Welfare

Hyer, Dr. Anna L., Director, Division of Educational Technology, National Education Association

Jones, Douglas, Legislative Assistant to U. S. Senator Gravel,

Martin, Guy, Administrative Assistant to Congressman Begich

Miller, J. E., Head, Communications Technology Section, Goddard Space Flight Center, NASA

Norwood, Frank W., Executive Secretary, Joint Council on Educational Telecommunications

Rubin, Philip, Director of Engineering Research and Development, Corporation for Public Broadcasting

Silverman, Donald, Office of Application, NASA

Smith, Showalter J., HEW Fellow

Whelan, A., Technical Coordination Officer, Federation of Rocky Mountain States Project, Goddard Space Flight Center, NASA

DENVER

Campbell, J., President, Federation of Rocky Mountain States

Law, Gordon, Director, Engineering and Broadcasting Federation of Rocky Mountain States

Rapp, William E., Vice President and Director of Planning and Administration, Federation of Rocky Mountain States